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- Finest Year (1985) K-Bike Purchase FAQ - Don Eilenberger (November 2001)
- K-100 FAQ - Brian Brumfield
- K1200RS Tips - Larry Wilbers (January 2001)
- K1200RS "Bulletin Board" - Vic Salemme (July 2000)

Adjust Valves on a 16V K Engine

By Mark Holland
January 2000

Firstly only one special tool is required & this can easily be made by your local machine shop. The tool required is pictured in the Clymer manual & is used to immobilise the cam chain tensioner when you remove the cam shafts.

The tool is based on an M20 x 1.5 bolt 43 mm long. Get this made on a lathe from hex tool stock as standard bolts will be high tensile steel, & too hard to drill. The locking sleeve is 25 mm long, make sure the OD is also only 25 mm or it will exceed the dimensions of the machining in the timing cover. Drill a hole as close as practical to the edge lengthways through the bolt. Make this hole 4.6 mm, you can then use an extra long 4 mm Allen key as the pin. This tool cost me $40.

Measure your valve clearances & if you need to change a bucket proceed as follows.

Return the engine to TDC on compression stroke No 1 cylinder. Both triangle cut outs in each camshaft sprocket will be at 12 o`clock pointing down. Check also that the slots at the rear of each camshaft are parallel & horizontal [note Clymer says vertical, perhaps relative to the motor, I am using the ground as reference].

Unscrew the blanking plug from the middle of the timing chain cover. Screw in your special tool 3-4 turns until the 4.6 mm hole is uppermost. Looking down past the camshaft sprockets insert the 4 mm Allen key until the end is just past the chain. Then rotate the tool clockwise until you have firm pressure on the chain & lock with the locking sleeve. NOT too much pressure as you cannot compress the tensioner [contrary to what it says in Clymer] as it has a non return ratchet in it, you are merely holding it in its present position.

With lacing wire & using the most convenient hole in the camshaft sprocket, tie the chain to each sprocket to prevent incorrect reassembly. It is possible to remove only one camshaft if required. Hold the required camshaft with a spanner on the cast in hex & remove the camshaft sprocket bolt. There is enough room to slip the sprocket with chain still attached with lacing wire forward off the camshaft. Then follow Clymer to remove the camshaft retaining caps & timing chain guide. You can remove the guide [brown nylon between upper & lower camshafts] with careful wiggling even if you are only removing one camshaft & still leave your lacing wires undisturbed.

When reassembling make sure the camshaft is in its correct position before tightening the caps. The rear slots will be horizontal, & the front locating spigot for the camshaft sprocket will be inboard. Prevent the shaft from turning as you tighten the caps with a spanner on the camshaft hex. Because you have wired each sprocket to the cam chain it is impossible to mistime the motor.

Please note this is from Mark Holland via my wife's e-mail.

Budget Oil Filter Wrench for K-Bikes

By: Bruce Keahey
May 1999

On a related note, although I own a BMW oil filter wrench, I've begun using Fram and other aftermarket filters, few of which the BMW wrench fits.

At a Checker Auto I picked a cheap plastic wrench that fits the aftermarket filters that the BMW wrench doesn't fit, but it was too thick-walled to fit into the K-bike's oil filter recess.

So when I got home, I rigged up a mandrel so that I could chuck the wrench in my drill press. While spinning the wrench at low speed in the drill press, I used a rasp to remove material from the outside of the wrench until it was the same outside diameter as the BMW wrench. Still plenty of thickness for strength. Then I switched to progressively finer grades of sandpaper on the spinning wrench until a smooth, matte finish remained.

I now have a filter wrench that fits aftermarket filters available everywhere, is light enough to pack in the bike tool kit on trips, and is cheap and easily replaceable in case I lose it.

Removing the K-Bike Air Filter

Harold Gantz (Hgantz@aol.com) writes:

Also, how the hell do you replace the air filter element? I removed the intake snorkle and unfastened the spring clamps on the air filter housing (1 in front, 2 in back). There doesn't seem to be enough room to separate the top half of the housing from the bottom, let alone extract the filter element. Do I have to disconnect the large diameter flex hose that runs from the element housing to the adjacent throttle body plenum? I removed it's clamp but the rubber hose was on so tight, I couldn't free it from the air filter housing. Is it ok to lever the hose off with a couple of screw drivers? Once off, will it go back on easily, or is it just as difficult to put back? Is there another way to get the air filter element out?

From:
"Diaz Jon" <jdiaz@mc.net>

I would remove the sidecovers and remove the gas tank clips so you can tilt it up. The air filter has a lip removed on the side that points toward the FI rack, so you just have to get the top housing up slightly to slide the filter out. I pull the housing clips, tilt the back of the tank up with a shoe, and just wiggle the top of the housing up until the air filter slides out.

Jon Diaz
K Whiner MC #2

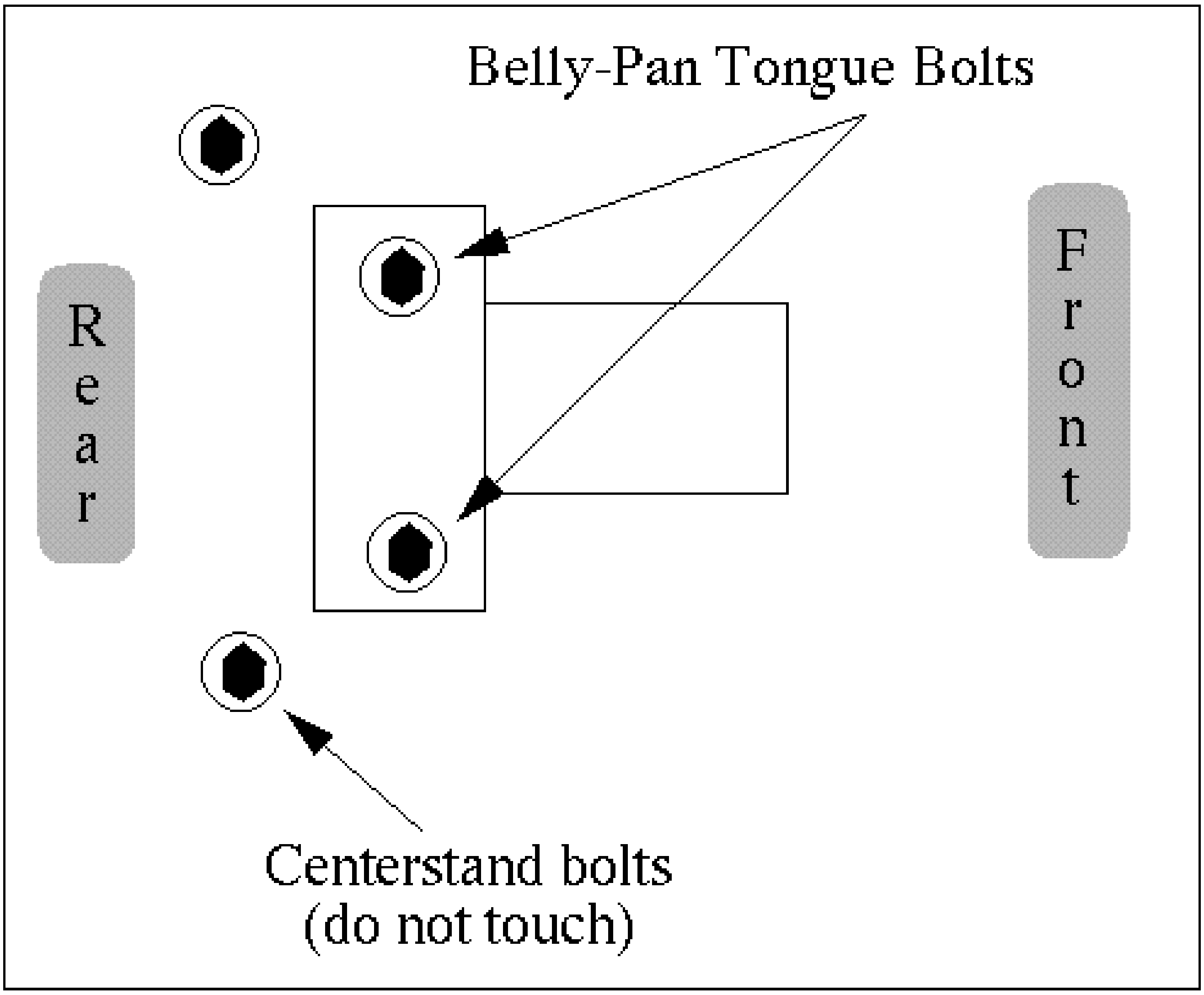
Changing Oil and Filter - BMW K75S

By Ben Zaborowsky - benz@lilly.com or benz@ncsa.uiuc.edu
September 1994

Removing the belly-pan

Put the bike on the centerstand and put a towel under the bike to keep the belly-pan from getting scratched. If you are lucky this is all you have to do; remove the two belly-pan screws and slide the belly-pan forward ever so slightly until it falls into your hands.

However, this slightly more detailed method may be required. Remove the two socket head cap screws from the front of the pan. Loosen the two screws that hold the rear tang which in turn holds the rear of the belly- pan in place. The two screws up front face straight up, and will need to be removed by laying on your back with the business end of the allen wrench (5mm) pointing up into the air. The two in back are 8 mm, and also point straight up. Be careful to get the right ones: the two bolts that hold centerstand are near the bracket bolts, and their mistaken removal could leave you with a lap full of motorcycle.



The two rear bracket bolts only need to be loosened to let the nose of the belly-pan drop enough to give you maneuvering room to remove it. With the two cap screws out of the front, slide the belly-pan forward and off the mounts. The tongue that engages the grommet at the front-top-center of the pan may not want to cooperate at first, and the pan itself may hit the lower fairing before the tongue disengages from the grommet. Wiggle it around and spring the pan enough to get it off the lower front mounts and it will drop off the top front mount on its own.

Draining the oil and removing the filter

With the belly-pan off, pull the drain plug and let the oil drain. If the engine is warm/hot the oil drains faster. Don't pull the fill plug right away; the oil drains a little slower, but reduces the chance of a mess.

There are the three screws in the cover over the oil filter. Take two of them out all the way and just loosen the third. Be careful because there is hot oil back there and it will burn your wrist. Let it drain for a while, then remove the final screw and cover. Be careful not to damage or lose the O-ring on the cover unless you have a new one handy.

Insert the oil filter wrench into the filter cavity and remove the oil filter. Don't tip the filter because it is full of oil. Clean up the oil cavity with a rag until nothing more drips out (this is not a requirement, but I do it anyway).

Installing the new filter and adding oil

Fill the new filter with oil, oil the rubber gasket, put on the filter wrench, but not the socket wrench, and install by hand. When it tightens, use the socket wrench to put another 1/4 turn on it.

Clean the cover surface, put the O-ring back in the groove. If the old one is damaged, stiff, or deteriorating use a new one, otherwise you can reuse the old one. Tighten the screws in a cross-pattern until they bottom out. You don't need more torque than that. You also don't need new wave washers for those screws.

Clean and inspect the drain plug. Put on a new crush washer (don't worry if you don't have a new one, replacing it every other oil change is OK). Replace the drain plug in the engine. (I put a wrap or two of plumber's teflon tape around the drain plug as a bit of extra insurance against leaking and possibly loosening and dropping out.) Torque to spec, or until you feel the washer squash.

Add oil to top of the red circle.

Start the bike up and make sure nothing leaks. Wait about 15 minutes, then top the level off at the top of the red circle. If you are high, no sweat.

Reinstalling the belly-pan

Loosen the two screws that hold the tongue bracket that slides into the belly-pan (if you didn't do this in the first place). You don't have to remove them, just loosen them. Put a little mechanics' hand soap on the tongue if you want to help it slide on the belly-pan bracket, insert the belly-pan at the back, and carefully line up the front before pushing it back toward the rear of the bike. It is a tight fit between the front of the belly-pan and the radiator cover, but this method should let you put the pan back on without loosening anything else. Replace the two screws in the front of the belly-pan, but leave them loose for now. Now tighten the screws on the tongue bracket and then tighten screws in the front/bottom of the belly-pan.

Clean up the area, wash your hands, put on your helmet and jacket, start up the bike, and go for a ride!

Notes on oil filter wrenches

There are several sources for oil filter wrenches. BMW dealers have the official wrench, always a good choice, but expensive. You can also buy a generic one from Competition Accessories for about $5.00 or you can try K-Mart, Auto Source, Honda, foreign car parts stores, Spike White, rallies, etc. Take your filter and go hunting. I recently found one at K-Mart: DFM No. 1003, $2.97

Other than fitting the filter you must make sure the wrench will fit into the oil filter cavity in the engine too. Some of the generic filters may need a little filing to make them work. (The wrench that is, not the engine block :-)

Thanks

Special thanks to Jon Diaz, Scot Marburger, Robert Besinger, et al. I have plagiarized their wonderful instructions unashamedly.

Standard disclaimers apply.

Changing the Coolant
Filling the Radiator

Mon Jan 29 1996 Harold Gantz (Hgantz@aol.com) Asked:

I plan to replace the coolant. Is there any easier way that requires fewer fuel tank removals?

From: "Diaz Jon" <Diaz_Jon@macmail1.swindon.rtsg.mot.com>

Yes, drain the system down at the water pump (don't forget the new crush washer) and pull the gas tank back so you can remove the radiator cap. Do not lose the rubber gasket inside the radiator cap....funny/ embarrassing story I'll review another day. Let the system drain for 15-30 minutes, then replace the drain plug, and slowly (trickle) the new coolant into the system, stopping every few minutes to let things settle. You should be able to get most of it in there that way.

Remove the coolant overflow (since you are servicing the battery, you've already removed the bracket holding everything down) bottle and dump the old stuff into your bucket. I fill the bottle to the halfway point between MAX and MIN, and then after that first ride, top the overflow back up to MIN after everything cools off.

Some folks go to the MAX level, and end up having coolant pee all over them when the bike gets stinky hot (right Joe Senner?), but I've used the MIN level as my cold setting and never had a problem.

Date: Mon, 21 Aug 95 17:00:52 EDT
From: Tom Coradeschi <tcora@skylands.ibmwr.org>

Jonathan Hutchins wrote:
When you're refilling the radiator on the K bike (K100), what's your procedure?

Pull the tank back and to the left as far as it will go. Use a rag (school of hard knocks, here) to protect the tank from the plastic (still hard enough to scratch the paint) bracket on on the inside of the RS fairing.

Fill the radiator and start the engine. When the thermostat opens, the coolant level will drop, so top it off again, put the cap on and put the tank back where it belongs.

Check the overflow to make sure it's up to the "Max" line and go for a ride. Next morning, check the overflow again. It will have dropped a little, but not much, so bring it back to Max and you're done.

`tom coradeschi <+> tcora@skylands.ibmwr.org`

Checking Valve Clearance on a K1100LT

After all the horrible stories that I have heard about folks getting surprised when they take their bikes in for a valve adjustment, my curiosity got the best of me and I just **had** to know how many of my valves where out of adjustment.

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Tools and Preparation

- Tools
  - #2 Phillips Screw Driver
  - Small regular screw driver or stiff wire
  - 13 mm socket
  - 10 mm socket
  - 13 mm open or boxed wrench
  - Extensions
  - 5mm hex
  - 6mm hex
  - Feeler gauge set

    Here's a conversion table. Make sure your set contains the range below. Some cheap sets do not.

  - Gasket Sealer
  - Rags
  - Cardboard or plastic for the floor

- Preparation
  1. The adjustment must be done stone cold. I believe the manual says 95F maximum. - *Bryan Lally*
  2. Haynes says the maximum head temperature is 68 degrees Fahrenheit. I think this is unrealistic. This would mean you could not set the valves in many areas of the US during a summer day. Clymer's says maximum allowable cylinder head temperature is 90 degrees Fahrenheit and this sounds about right. - *Brian Curry*

3. After the last ride before I plan on checking the valves, as I park the bike, I pull into the garage and turn the engine off. Then I lean the bike to the right and hold it for 30 seconds or so. As far to the right and for as long as I can manage. Then I put it on the center stand without putting it on the sidestand or leaning it to the left. This gets almost all the oil out of the valve cover, reducing the dripping mess considerably. - *Bryan Lally*

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Stripping Down to the Valve Cover

Skip This Section go to Valve Cover Removal for other 16 Valve K's

1. Remove the left side body panel cover over the fuse area.
   - Rock the rear of the cover while pulling out, to pull it off the rear pin.
   - Slide your hand up under the center of the cover, palm toward you, until you can feel the attachment point of the little arm which is bonded to the cover and exert pressure with your finger tips, away from the bike to pop the yoke away from the mount.

   Once you have seen he rear of this cover, you will understand why so many of them have been broken, and why it is necessary to be careful with them.

   - Pull the cover out, then to the rear to remove it.
2. Remove the left side panel and fuel gauge.
   - Remove the single machine screw in the center of the panel.
   - Remove the two screws inside the radio cover latch area.
   - Pull off the cover and unplug the fuel gauge wire.
3. Remove the radio pocket

   Don't remove the radio out of the pocket with the pair of "forks". It's much easier to spring the whole radio chassis out of the pocket, then remove the pocket itself. Also, there is no need to re-enter the radio code.

   - Spring the clips through the three, 4 mm round holes. The three holes are on the outer facing of the radio flange. *(stiff wire, or small screw driver)*
   - The holes are at 12, 9, and 6 "o'clock"
   - Pull the radio up and place it on a pad on the handle bars covering the key area and switches.
   - Remove the two phillips screws on the front inside of the pocket, and raise the pocket up.
   - Put the radio back in the pocket and lay the pocket holding the radio back up on the padded area.
   - Tie it down with a bungie. Mine almost slid off.
4. Remove the left side crash bar. *(13 mm socket, 13 mm open or boxed end wrench)*
   - Pull out on the plastic cap in the end of the upper mount tube.
   - Remove the 13 mm nut inside the tube. You will need a deep socket or an extension to reach into the tube.
   - Remove the two 13 mm nuts on the lower studs. The rear one has a braided ground strap. Be careful not twist the strap and break it. (Don't ask me how I know this)
   - Pull the crash bar off the three mount studs.
5. Remove the left side lower fairing.

*It is helpful in this step to figure some way to remember which screw goes where. I wrote a description of the screws on paper, as well as laying them out on the floor in the order and shape of the lower fairing, so that they would not get mixed up. There are **several** different types and lengths of screws holding the lower fairing on.*

- Remove the machine screw from the back, inside of the fuel gauge area.
- Remove the screw from under the rubber mount at the lower rear.
- Remove two screws from lower front.
- Remove four screws from the backside, behind the fork tubes, where the radiator grill is located
- While supporting the lower fairing with one hand, unscrew the three anodized screws under the radio pocket area.

The fairing will fall off into your hand when you loosen the last of these three screws, so catch it!

6. Remove the 10 mm bolt securing the mount arm on the rear, top of the head. This arm accepts two screws via body clips, below the fuel gauge. Don't let the clips get away.

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Valve Cover Removal

*The BMW manual strongly tells you **NOT** to remove the spark plugs before checking valve clearance. The reasoning is that carbon from the plugs or threads could wedge under the valve seats and give a false reading.*

1. Remove the four hex bolts holding the spark plug cover. *(5mm Hex Wrench)*
2. Stuff a rag in the area of the spark plug wire caps. This will catch any oil that drains down from the upper, intake valve side of the head casting.
3. Loosen eleven round headed hex valve cover bolts. Some will come out all the way, while others will remain in the cover. *(6mm Hex Wrench)*
4. Place a pan or some cardboard under the valve cover.
5. Bump the cover with your fist, while pulling it away from the head.
6. The valve cover should almost drop off when you remove the bolts. Use a soft rubber or plastic mallet if it will not. Or tap it using the wooden handle of a conventional hammer. If it is stuck, make sure you have all the bolts off, you have probably missed one. (DAHIK) - *Brian Curry*
7. Wiggle the cover off the head being careful not to tear the rubber gasket.
8. When you do this, it is good to have a spare set of new valve cover gaskets available. This scares the old gaskets into submission and they will not hurt themselves and need replacement. ;););) - *Brian Curry*
9. Locate the grounding spring on one of the posts inside the cover area. It should stay on the post, but it you don't see it, find it.

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Checking Intake Valve Clearance

The Top Cam

1. Shift the transmission into 5th gear.
2. Get a paper and pencil. Make a drawing on the paper to correspond with the valves so that you can write down two numbers for each valve.

3. Disconnect the coil wire at the distributor cap and ground it to the engine somewhere. - *Mick McKinnon*
4. Rotate the rear wheel counter clockwise (as if the bike was traveling forward) until the one set of lobes points directly away from the buckets.
5. The valve stems are splayed outwards away from the sparkplug cavity. So when the cam lobe is 180 degrees out (opposite) the valve stem, (the measurement position) it will be pointed somewhat up or down and not simply "out". - *Brian Curry*
6. Starting with 0.127 mm, slide the feeler gauges between the cam lobe and the bucket until you find the size that will **not** go under the cam lobe.
7. I found the feeler gauges can be inserted to check the clearance most easily from the spark plug cavity direction. - *Brian Curry*
8. Write down the two sizes for each lobe, the one that will go under, and the one that won't go under.

If 0.127 mm will not slide under a lobe, the valve is tight, use successively smaller ones until you find one that does go under. The clearances for the intake valves should be between 0.150 mm and 0.200 mm.

9. Continue rotating the rear wheel to bring up a set of intake valves, and then measure to get the two reading for each of the eight valves.
10. When you finish you should have eight pairs of numbers. Here are mine.

	1A	1B	2A	2B	3A	3B	4A	4B
YES	0.152	0.152	0.152	0.152	0.178	0.127	0.152	0.152
NO	0.178	0.178	0.178	0.178	0.203	0.152	0.178	0.178

11. Your valve clearance is somewhere **between** these two numbers.
12. By looking at the above numbers, numbers 3A and 3B could be in need of adjustment. 3A could be loose and 3B could be tight. So far, so good, but exhaust valves may bring some bad news.

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Checking Exhaust Valve Clearance

The Bottom Cam

1. Follow the steps for the intake valves, except the clearance for exhaust valves is 0.200 mm to 0.300 mm

	1A	1B	2A	2B	3A	3B	4A	4B
YES	0.229	0.178	0.254	0.229	0.305	0.279	0.279	0.330
NO	0.254	0.203	0.279	0.254	0.330	0.305	0.305	0.356

2. Looking at the above, number 1B is tight, 3A and 4B are loose.

Bad news. Three exhaust valve buckets need to be changed. With the two intakes that are close, I need a total of 5 buckets. At $22 each, I need $110 worth of buckets.

To change the buckets, the cams have to be removed and it takes several special tools to do this. I don't know how many shop hours it takes to do the adjustment, but after I take the bike in, I'll add the info to this page.

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Reassembly

1. Clean the valve cover and the head surface completely of oil. I used kerosene and mineral spirits on the valve cover, because it is painted and my standard solvent for gasket prep, lacquer thinner, might have taken the finnish off the cover. I wiped down the head surface with lacquer thinner .
2. Clean the rubber gasket of sealant. It took me over an hour to remove the sealant off the gasket. The manual says to use Threebond 1209, which I could not find, so I used Permatex high temp black sealant.
3. Place the cover, gasket side up, on the ground or a table and insert the gasket into the cover. The gasket has a "T" shaped cross section, and the base of the "T" inserts into the valve cover.
4. Align the index marks in the "half moon" projections in the rear of the cover, with the index marks on the gasket.
5. Don't use sealant between the gasket and the cover.
6. Work the gasket into the channel toward the front end of the cover.
7. Place a light coat of sealant over the "half moon" projections, and be sure to cover the corner where the projections connect with the flat part of the gasket. (I spooged the whole thing)
8. Make sure the grounding spring is on the post and put the cover back on the head.
9. Insert the eleven round head hex bolts and run them down, but don't tighten them.*(6mm Hex Wrench)*
10. Starting from the center, and working in a criss-cross pattern, tighten the bolt to 8 newton-meters. (Which is not much, so have the right torque wrench)

    The valve cover gasket compression is preset. It cannot be "snugged down" greater than the amount allowed by the *shouldered* bolts. (The shoulder, not the gasket causes the resistant to tightening.) When they are "snug" they are as tight as they are going to be. Tightening them more will not squoosh the gasket. It will pull the mounting threads out of the cam shaft pillow blocks. This is not a good thing. If you pull the threads out, it is new head time, as the cam shaft pillow blocks are linebored. IMO, I think the "factory torque value" for these fasteners is too high. If the cover is leaking, figure out what is caught in it, or get a new one, or try putting some silicone caulk/seal on it. - *Brian Curry*
11. Follow the reverse order of disassembly until you have it all back together.
12. Let the bike sit overnight for the sealant to cure.
13. Call Pat Roddy and meet him at the local Harley Dealer.

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Comments From Others

- *Scott Lee*
  - Gasket sealer goes at the upper-left corner and near the half-moon gaskets.
  - Grave warnings not to over-torque the valve-cover retaining bolts are in order. The result of stripping out a valve cover bolt are:
    - Leaky gasket if bolt strip not repaired.
    - Helicoil/keyinsert to repair, if repairable.
    - NEW HEAD if not repairable, as the cam retaining blocks/saddles are aligned bored with the head and are NOT interchangeable.
  - The way that works for me (no leaks) is to use a 1/4 inch drive ratchet (small handle, less torque transmitted, better "feel"), and "tighten firmly, but not too firmly" after feeling the bolt bottom out. Same method (and warnings..) for the crankcase cover apply, BTW. Even though I am a firm believer in using a torque wrench, the cost/availability of quality torque wrenches that read that low is questionable, and if the torque wrench reads wrong or doesn't "click", you can be in a heap of trouble quickly, especially the novice

mechanics that will be using the FAQ as guidance (remember your audience).

- Your instructions are obviously for a 16 valve LT. Leaving out the bodywork removal tips would probably be OK.
- Metric measurements-MANY people use english unit feeler gauges, so including those numbers would probably be a good idea.
- The gaskets are good for 2 or 3 uses, then will need replacing, WITH the rubber buttons on the bolts and half-moons. Rubber buttons are best removed from the bolts with a pair of "diagonal wire cutters" (AKA dikes).
- Well, how do you adjust the valves?? Several expensive special tools to remove/replace the cams, etc.?? What exactly does it take? If its' $150.00 in special tools, and a 3 hour labor hit, the tools pay for themselves the first use (assuming zero value for your time). Shim measurement and the tools required (micrometer vs. dial calipers, etc.) might also be a discussion area...

- *Graham Smith*
  - Most BMW dealers have an EXCHANGE service for the shims. New shims here are AUD $30.00, exchange is $8.00. I needed 8 shims after shuffling around what I had because ALL of my valves had been lapped in after the head service.
  - "In the know" tip #1: If you have to take the head off, you can check the clearances BEFORE you put the head back on the bike. This way if you have a clearance that's too small, you can remove the valve and polish off a bit of the valve stem top until you have correct clearance, saving you a shim.
  - I didn't think I needed ANY special tools. Albeit I have a well stocked tool box, but I didn't need anything more special that a GOOD set of feeler gauges and a torque wrench.
  - I have been advised by "People in the know" NOT to use any sealant on the rubber gaskets except for the "T" or the "Cross" as it is known, where the timing case meets the head, and a little on the 1/2 moon parts. Otherwise NO SEALANT AT ALL is required. Suggested sealant is Wurth super silicone. (The RED stuff)
  - Warning - Do NOT do any of this if you are not familiar with timing gear and it's assembly or disassembly. If you get it wrong you will have valves putting holes in pistons where there were none before.
  - You have to remove the cams to change a shim. The "Special Tool" and "Cams in head" replacement is for K100 ONLY. To remove the cams, you have to remove the crankcase cover and timing chain cover. Turn engine over until you are at firing position TDC number 1 cyl. Then remove timing chain tensioner and cam sprockets. This will allow you to remove all the cam retainers & cams and start to change shims. Use a magnet to remove the shims from their guides. Use Engine Assembly Grease (MolybdinumDisulphide +Graphite) smeared around the OUTSIDE of the shim when installing and also all over all cam wear surfaces and head bearing surfaces. Install cams, attach sprockets, install tensioner, turn engine over by hand a few times and repeat entire process until you run out of patience or correct clearance shims and give it away until next weekend. At that rate it's taken me 5 weeks to put the covers back on...

- *Richard Cliatt - wrench @ Global Imports, Atlanta*
  - Valve adjusting buckets should not be swapped around or re-used because of the wear pattern develops on the bucket.
  - Throttle bodies should be balanced after a valve adjustment because changing the amount of opening of the valve, changes the volume of air flowing through them.

- *Brian Curry*
  - I use a "Go-No Go" measurement technique. I find it easier than knowing I have the correct amount of feeler gauge drag, or what a "firm push/pull" is. For a measurement of 0.007" I would use three gauges: 0.006", 0.007", 0.008". The 0.006 should go through with virtually no drag. The 0.007 should go through with some drag. the 0.008" should not go through at all. The result is that the clearance is 0.007" This has worked fine for me for

over 200K miles of R bike service. In a "measurement mode" I find the gauge that is blocked. I then check that the next lower gauge thickness will push through and the two thicknesses lower gauge passes easily. So, if 0.010" is blocked, 0.009" pushes through, and 0.008" passes easily, the clearance is 0.009".

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Conversion Table

- inch - mm
- 0.005 - 0.127
- 0.006 - 0.152
- 0.007 - 0.178
- 0.008 - 0.203
- 0.009 - 0.229
- 0.010 - 0.254
- 0.011 - 0.279
- 0.012 - 0.305
- 0.013 - 0.330
- 0.014 - 0.356

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Cold Running Problems

From: Rob Lentini <roblentini@cox.net>
Subject: BMW: K75 Starting Problem

Ken Korn's K75 has cold running woes:

Assuming your bike is well-maintained, has had a recent tune-up, and the battery is good, you might troubleshoot the coolant temperature sensor circuit. The fuel injection is programmed for coolant temp, and the engine will run like crap if it doesn't get a proper signal.

The sensor is located on the top front of the engine, just aft of the cam chain cover. It's mounted on a standpipe which accepts the radiator hose coming from the left side of the radiator to the engine. There is a three- wire connector attached to the sensor. The sensor itself is a negative temperature coefficient design, meaning that as coolant temperature increases, resistance of the sensor decreases. This particular sensor has two elements; one side inputs to the fuel injection computer, and the other to the coolant overtemp light and fan. Both elements have the same temperature/resistance curve.

Using a wiring diagram and multimeter, check for continuity from the temp sensor connector to the fuel injection computer connector. DO NOT attempt to measure through the computer; you could destroy it.

If continuity is good, measure resistance through the sensor. With the engine cold you should have, if memory serves, several K ohms through both circuits in the sensor. If you don't, the sensor is probably defective. Drain the coolant, remove the sensor, and recheck it at various temperatures by heating the sensor in water from cold to boiling. At high temps you should measure, again if memory serves, only a couple of hundred ohms. Conversely, you can freeze the sensor in your freezer, and the readings should be several K ohms. Lone Star should have a temperature/resistance graph they may be willing to copy for you; Iron Horse did for me.

Be sure the sensor is bad; new ones cost about $40! If it is bad, it should be reading low resistance at cold temperatures. This would tell the computer that the engine is warm, and needs a leaner fuel/air mix--just the opposite of actual requirements.

Other things (like Jon Diaz mentioned - valve clearance) could cause your problem, so check out the whole enchilada.

Good luck, Rob Lentini
87 K75S
Tucson, AZ

Coolant Change Trick

By Fred Scott
September 2000

This may well be an old trick, but I noticed that your coolant articles didn't mention it, so I thought I'd pass it along. It's a simple method for changing your coolant without ever removing the gas tank.

What you need is a fluid pump with an attached hose. You can buy these at auto parts stores for less than ten dollars, and they're designed to screw onto the mouth of standard antifreeze containers.

Unscrew the top mounting screw on your radiator so that it can swing forward about an inch. The filler cap is connected to the radiator by a short rubber hose. You can now disconnect this hose from the radiator without removing the fuel tank. So once you've mixed up your antifreeze, refill the original container with your mixture, and put the pump on the container. Use the hose on the pump to pump the fluid directly into the radiator. Pump slowly so that the fluid doesn't spill. Eventually, the radiator will be almost full, and you can reconnect the hose. Fill the reserve tank as normal.

You will have some air in your cooling system, so don't go on a long road trip right away. Take some short rides, and let the engine cool between rides. Each time it cools, fluid is sucked from the reserve tank into the system, and when it heats again, air is released from the overflow into the reserve tank, and out. So carry a small amount of coolant with you to top off your reserve. In my experience, half the capacity of the reserve tank is plenty.

I don't know if this is actually faster than taking off the tank. If you're a pro, it's undoubtedly slower. However, it's also a lot easier.

Fan System Diagnostics for Two-Valve K Bikes

By Jeff Dunkle

The K web site contains some good suggestions from Jon Diaz, Rob Lentini, and Tom Coradeschi about the K cooling system. Do review this material first if your having a fan system problem.

It seems lately that I've had the "opportunity" to help several K owners trouble shoot their fan system. Here's some things I've picked up in the process. I'm synthesizing things from the web site, other posts I've seen and stuff I stumbled on to.

System Function:

All BMW K motorcycles have electric fans mounted behind the radiator. The fan motor is controlled by a system that detects coolant temperature and energizes the fan motor only when necessary. The following is a discussion of the control system on the L-Jetronic, two-valve models. The four-valve, Motronic bikes have a somewhat different circuit configuration. The system works by getting a signal from a temperature probe in a standpipe located on the front, top, left corner of the engine. As the temperature of the coolant goes up, this probe's resistance goes down. This variable resistance goes to the fan relay (BMW I think calls this unit a "fan switch) located in the electrical box under the rear of the gas tank. When the resistance corresponds to a temperature of 217 degrees F, the fan is switched on. At 232 degrees F the over temperature warning light is switched on. That's it. It is possible to do some fairly simple testing on each component except the relay. The Clymer manual suggests a test which I've not tried, but which would include the relay in the functional check of the system.

System Parameters:

```
Clarence Dold summarized the following for us, according to the 93
K75S Owners' Manual:
Thermostat starts to open at 85 C                (185 F)
Fan Cut-in at 103 C                              (217 F)
Overheat Warning Light at 111 C                  (232 F)
Pressure relief valve opens at 120 C/1.1 bar     (248 F/16 psi)
Vacuum relief (return valve) opens at -0.1 bar   (-1.45 psi)
```

System Maintenance:

Spin the fan once in a while:

The fan motor is not the most robust unit I've ever seen. Jon Diaz and others frequently remind folks to simply reach in and spin the fan with your finger from time to time when the bike's parked to assure that it rotates freely. The bushings in this motor are vulnerable to grit and stuff getting in. If the fan doesn't turn freely, the motor will eventually fail.

Clean Connectors & Apply Dielectric Grease:

One bike we worked on got fan system function restored when the temperature probe electrical connector was removed, the contacts cleaned a bit, and dielectric grease was applied. Having restored a dysfunctional speedometer by doing the same thing to a connector in the system, I've become a great believer in using dielectric grease most any time I've got a connector apart.

Idle Test:

The simplest test of the system is to start the bike, let it idle, and listen for the fan to come on. My experience is that if it's going to work, the fan will come on at about 8 to 10 minutes of normal idle. This worked for me testing K75S and one K100. I'd be uncomfortable doing this longer than 15 minutes. One bike I saw that was left to idle for about 25 minutes (and was subsequently was found to have a bad fan circuit) "blew it's guts" after about 25 minutes of idling by spewing half it's coolant out of the over flow tank filler.

Tests that can be run from the relay connector under the tank:

The fan relay (switch per BMW?) is located in the "relay box" under the rear of the gas tank, in the middle of the right side. Its a whitish color. Remove the mount screw, lift the relay and disconnect the connector plug on the base. There's a contact chart on the side of the relay that corresponds to the tabs on the base of the relay. The following is a chart for the connector using the same numbers, mirror imaging connector chart from the relay/switch. These connection labels correspond to those on the Owners Manual wiring chart. I've confirmed most of these connections with wiring checks.

```
Female connectors plug

              (molding ridge)------\
                           __________^_________
     Key:                 |                    |
                          |  |(E)   []    (9)| |
     | (female            |                    |
         connector)       |                    |
                          |        (15)        |
     []  (empty slot)     |  |(A2)  __  (A3) | |
                          |                    |
                          |        (31)        |
                          |  []     __      [] |
                          ______________________

Components attached to each connector:
E  - temperature sensor
9  - goes somewhere that looks eventually like fuse #6
A2 - fan motor
15 - fuse #7
A3 - Overheat light
31 - ground
```

These tests can be run by using a multi-meter and/or jumper wire on the various connector terminals to the relay/switch for the fan.

Temperature probe "test":

Measuring the resistance between E and 9 will read the resistance of the temperature probe. "Normal" cold bike readings I've seen are (+-) 2,200 ohms. On colder days, closer to 3,000 ohms. If you warm the bike up, quickly remove the tank and take a reading, expect to see about 520 ohms. Readings in this range cold and hot seem to confirm normal temperature probe function.

Over Temperature Warning Light test:

With the key turned on, touching a jumper wire to connectors 31 and A3 should turn on the over temp. warning light. If not, check fuse 7, the light itself, then wiring between it and the relay box.

Fan Motor Test:

With the key turned on, touching a jumper wire to connectors 15 and A2 should turn on the fan motor. If not, further test of the fan is needed. What I've done in the past is unmount the radiator enough to expose the fan and loosen the connector plug. First measure the resistance through both leads in the fan connector. You should see a very low reading, about 3 or 4 ohms or so. Next jumper 12 volts+ to the colored wire connector and ground the brown connector wire. The motor should run. If not, it's probably burned out or has damaged brushes. I saw one motor with the brush housing totally melted.

If it does run, next measure the voltage coming out of the plug supplying the fan. To do this, turn on the key, put a jumper from connectors 15 and A2 at the relay plug, then connect your multi-meter to the fan power plug, red to colored wire connector, black to brown wire. You should read 12+ volts. If not, you have a wiring problem or blown fuse.

Clymer suggests testing the fan/system by disconnecting the temperature sensor plug and jumpering the connectors. With the key on, this, they say, should turn on the fan motor. I've not done this test yet and cannot speak to it's validity. It would introduce a zero resistance into the sensing circuit in the "relay", which is probably OK. This would test both the relay, fan, and associated wiring. It's much easier to remove the tank and get to the relay box than access the temperature probe.

Access/Removing the fan:

It seems that you need to remove the radiator on any bike I've worked. Remove any fairing parts necessary. Drain the coolant at the small plug on the water/oil pump. Disconnect all radiator hoses. Remove the mount screw on the top middle of the radiator. Lift off. It simply hooks to two rubber bushings on the bottom. Disconnect the fan lead plug. Unbolt the fan. The replacement fan comes as a complete unit, motor, fan and shroud. Jon Diaz reminds us that this is an ideal time to inspect all the hoses, clamps and fittings. After reassembly, be sure to check for leaks after the system is up to operating temperature and pressure.

Accessing/Removing the Temperature probe:

Either remove the air box or the radiator. The connector to the temp probe requires a little judicious prying to get the wire snap connector free. In either case, you'll have to drain the coolant as the probe penetrates fairly low in the system plumbing. The easiest tool I found for removing the probe, if that's necessary, is a 19 mm box wrench. Other tools don't fit in the available space. I did find one bike where the connector to the probe was corroded enough to fail the system. Some contact scraping and a couple of dabs of dielectric grease got things working again.

I stove top tested one probe by putting about an inch or so of water in a pan, putting a wrench socket, large end down, in the water, and sitting the probe in the square drive hole. I measured the probe resistance cold and got 3,200 ohms. When the water boiled, the resistance was 480 ohms. The test was fun to do, but I'd only go this far if you didn't get some expected resistance readings at the relay connector. Getting the probe in your hand requires draining the radiator and takes about 45 minutes work getting to the unit.

Parts:

K Fan Control/Relay (I believe BMW fiche calls it a "switch")
BMW Part Number: 61.31-145009
approximate price: $75

Temperature Probe
BMW Part number: 61.31-1459197
approximate price: $40

Temperature probe manufacturer's numbers:
Bosch 649
0280 130 032

Fan
BMW Part number: 17.40-1460427
approximate price $90

Please let me hear about any suggestions or corrections to this material.

Diagnosing K-Bike Fuel Economy Problems

By Don Eilenberger
June 2000

I have a 1985 K100RT with 110K on it. The bike runs OK but the gas mileage has gotten steadily worst since the bike turned about 80K. Compression is within specs and valves are adjusted. I have rebuilt the injection system, with the exception of the injectors themselves as they were clean and had a good spray pattern. O2 level has been set to factory specs. The cam chain was replaced at 60K. The transmission had new seals and a bearing at 80K. The splines are lubed and in good shape. The bike is a bit hard to start, especially when it's cold. The best mileage I can get is 39, one up and under 5 grand. Over 5 grand and it drops to about 37. When 2 up, 38 is the high end and 34 the low.

Given it's a finest year K, it sounds like the temperature sensor for coolant temps is going south. The value of it can be measured at the FI computer connector. If the sensor fails high value (most likely failure mode) - the computer thinks the bike is cold when it isn't - and injects too much fuel.

I am also assuming that since you checked most things - you also checked that the brakes aren't dragging or anything obvious like that.

BTW - the O2 value setting on K bikes ONLY works at idle. A clue to a rich mixture is the reading above idle - if you read > 2% CO above idle - you're running rich, which will result in poor milage.

Testing the K bike temperature sensor:

The temperature sensor on the K bike control the mixture of the bike in relationship to the engine coolant temperature. It is a NTC (Negative Temperature Coefficient) sensor, ie, as the temperature rises - the value decreases.

The value of this sensor can be measured without serious disassembly of the bike. Unfortunately - replacement is not quite that simple. It is a dual sensor - one half controls the temperature warning light and the cooling fan, the other half feeds information to the FI computer telling it the amount of fuel to feed (ie - mixture).

To measure the side going to the FI computer, you need a decent Volt-Ohm-Meter (VOM). Radio-Shack carries one which is very handy for bike use - since it is tiny and easily carried on the bike (about $20 or so - Model 22-802)

To check the temp-sensor, you must first remove the connector from the FI computer. Next locate pin #10. This is one side of the sensor. The other side is ground, so any clean frame point will work.

Measure the sensor at several points (suggested by the * below)

0 degrees C	5.5k ohms (freezing)
20 degrees C	2.5k ohms (~ 71F room temperature) *
40 degrees C	1.25k ohms
60 degrees C	600 ohms
80 degrees C	320 ohms

100 degrees C	190 ohms (boiling, or about where the fan turns on) *

The two measurements taken at room temperature and when the fan turns on will give you a good idea if the sensor is OK. If the reading obtained is off by a factor of 2 (or more) it is safe to assume the sensor is bad, or the wiring leading to it has a problem.

When probing the computer connector - do NOT push the probe into the connector, you just want to touch the connector with the tip of the probe (if you deform the connector, you'll have much bigger problems).

I would suggest measuring the value with the bike at room temp - before starting it, then reconnect the connector, start the bike and let it idle until the fan comes on - then do the second measurement.

Replacing the sensor involves draining the cooling system, the either removing the radiator/fan assembly, or it is also accessable if you remove the filter-airbox assembly Either is a PITA, but the only way to get at it that I know of.

Hope this helps.

Hot Running Problem Solution

By Ed Milich
April 2001

I have a submission for the K-Bike tech articles. It's on a K100 hot running problem.

This problem has happened to myself and a few other K100 owners that I've talked to. We never found the exact source of it, but we gained some insight, and effectively cured it.

The problem can be described as a fuel problem during hot conditions. For example I was riding through the desert @ 85MPH in 115 degree heat. Bike loses power for a few seconds. I struggle to keep it running, bike gains power again, and the problem repeats until the bike finally won't run.

After sitting on the side of the road for 5 minutes, the bike will start up again. This happened 2 or 3 other times to me. Each time, it was relatively hot outside (upwards of 90 degrees F).

The bike in question was an '85 K100 with 50k miles on it. At the time, the bike was in a good state of tune, with a relatively new fuel filter. Upon examination, the gas tank was hot to the touch.

First thoughts: Gas tank vacuum problem? No- I opened the gas cap when the problem first occurred, but this didn't solve anything. Gasoline is boiling somewhere in the fuel injection system? Weak fuel pressure? What we narrowed it down to is some kind of problem caused by gasoline that is too hot. Possibly gas boiling somewhere in the FI system. A quick internet search determined that gas boils at a range of temperatures (from 130 degrees F and up), due to differing formulations.

BMW added insulation to the underside of their tanks early in the K-bike series. Obviously, when the fan blows hot air from the radiator, some of the heat is transferred to the underside of the tank.

Add to this that the black tank cover that I was using at the time was absorbing a lot of heat from the midday sun. It's easily possible that the gas temperature in the tank could have reached upwards of 130 degrees F.

All of the people who had this problem were using a large tank bag and/or tank cover. In any case, I took my black tank cover off and the problem hasn't occurred again.

If the problem persisted, I was going to begin a thorough diagnosis by running a fuel pressure gage from the fuel rail, in order to check the fuel pump operation. Also, if your bike is not already equipped, some insulation under the tank may help protect it from heat transfer by the fan's hot air flow.

I hope this helps someone. The problem can be very frustrating.

Air Filter Replacement on the K12RS

By Lee Kirschenbaum
July 2000

The replacement of the air filter on a newer K-bike, can be a daunting task. BMW has chosen to access the filter element directly under the fuel tank, with absolutely no other way to get to it.

On the K12RS, (like my '98) you can do the work yourself. All the tools needed are in the tool kit that came with the bike.

The first thing you need to do, is remove the seat. If you've never done this, you use the ignition key to unlock the seat. The lock is located on the left side, toward the rear of the bike. Turn the key, push in the lock, and pull the seat toward the rear and up.

Both side 'skins' need to be removed. These are fastened with allen headed screws only, so one small wrench is all you need. The screws are different lengths, so try not to mix them up. There is one screw in the left skin(clutch lever side) that is not easy to find, and is unique to that side. It is up front, above and behind the tire. There is an air duct located right above it. All the screws are around the perimeter of the 'skin', so you don't need to worry about any hidden screws in the middle.

After you have removed all the screws, check to see whether you have the skin loose by trying to move it up and forward. The skin is very thin and care must be taken to not break the tabs that lock it in at the top of the fuel tank. The lower rear part of the skin must be carefully pulled away from the frame, to allow the upper part to release from the tank. Remember, BE GENTLE !!! They will come loose, and are very light in weight, so this is a one person job.

After both sides have been removed, you will have to remove the 4 bolts holding the fuel tank in place. This is a little more difficult, since the 2 bolts up by the steering head have some kind of thread cement (loctite ?) and are hard to remove. The right side access is a little tight, and you will only be able to turn the screw about 1/8 turn each time. I found that the screws, (allen , again) came loose much easier if you use a 'cheater' of some sort. What this amounts to, is either a small boxed (closed) end wrench or a small diameter pipe on the end of the allen wrench. This will give you the needed leverage to loosen the bolts. Simply use a small wrench (10-13mm) that has a box end, which you slip over the long end of the allen wrench. It should be set toward the end of the allen, with the open end of the wrench pointing up. This will give you app. 4-6 more inches of lever to loosen the bolt. You could also use a small diameter tube, or pipe, that would slip over the allen wrench. Don't use a pipe that is of a diameter, that would be too large, and not have the room to move the allen wrench.

The other 2 bolts are located at the rear of the tank, near where the seat was located. These bolts are much easier to get at, and don't have loctite on the threads.

When you remove the bolts, take care to get the washers and spacers that are under the bolts. The bolts are going through rubber grommets, and there is a spacer in, and a special washer behind, this grommet.

You will need to slowly lift the tank up, and to the right side. This is where you can loose the washers behind the grommets. I would use a piece of tape to hold them in place. You can remove it when reinstalling the tank.

The tank does not need to come off the bike, only moved to the side. All the fuel lines should be left intact, but I would recommend running your tank low before doing this job.

The tank will sit off to the right side on it’s own, but a small piece of 2x4 will help keep it away so you can get at the filter. The filter is located under a panel that is secured with 4 screws. This is right under where the tank was mounted, on the left of center. Remove the screws, take the cover off, and lift the filter out. You may have to use a pliers to grab the filter, but it lifts out pretty easy.

When reinstalling the tank, take care that all the spacers and washers are in place. The tank has a lot of movement, so don’t tighten any bolts until all 4 have been started. You may need to move the tank around a bit, to align all the holes, but it is no problem. I put a little blue loctite on the 2 front bolts, but I thing just tightening them well, is sufficient. Loctite is available at most automotive parts suppliers.

When installing the skins, be careful and always come in from the top. The tabs must go into the slots of the tank, but you will need to make sure the front is also moving into place. I found that sometimes they just fall into place, other times you need to take it off and try again. Don’t worry, the skins are flexible, and will give a little. As in the tank, don’t tighten any screws until all have been started. This is the time you will find out whether the fit is correct. Again, don’t worry, they are flexible and can be moved small amount. The real concern is paint chipping, which I have never had happen. Just take your time, and be careful. Don’t overtighten the skin screws. They don’t need to be any tighter than the pressure from the small allen wrench. DON’T add a cheater !!!

As an aside, this is a good time to change the oil, since there are only a few more allen screws to remove to get to the filter plate.

The total time on this job should be about 11/2 — 2 hours.

Good luck.

K75 Main seal repair

By Jon Diaz
February 1997
Updated September 2000

"With a lot of great input from Rob Lentini and Tom Coradeschi."

Main seal repair
I recently disassembled my K75 to fix a leaky rear main seal, and here's how it went (with comments and corrections from Bookawitz and Rob Lentini):

Have these parts in hand before you start:

```
11-21-1-460-456  19 mm o-ring         Qty. 1
11-21-1-460-696  Pressure Ring        Qty. 1
11-21-1-460-797  M20 Nut              Qty. 1
21-21-1-242-377  Clutch washer        Qty. 6
```

I also purchased:

```
12-41-1-459-445  Starter rebuild kit  Qty. 1
```

Procedure:

Start by draining the engine, transmission, and final drive fluids.

Remove the seat, fuel injection computer, tail section (don't forget to unplug the tail light!), rear wheel, rear inner fender, battery hold-down bracket, battery, and coolant bottle.

Unplug the speedometer harness and neutral switch. Remove the muffler, saddlebag brackets, and footpeg plates. For the right footpeg plate, I pulled it, the caliper, and the fluid reservoir off as a unit (remember to unplug its electrical connector as well). Remove the clutch cable from the actuating arm on the back of the transmission, and pull it free of the transmission casting.

Remove the final drive, drive shaft, swingarm, and shock absorber.

Remove the battery tray and mounts. I removed the starter and alternator, since those components had never been inspected for 130,000 miles, and I wanted to inspect them more closely. I also removed the small plastic cover near the transmission filler for more finger room.

At this point you should be looking at a well-stripped back half of the bike. Using saw horses and sections of 2x4, support the rear sub frame of the bike. Raising it in the air slightly will be necessary, so have a friend help you do this. Pull off the centerstand to minimize the stuff attached to the transmission (loosen the sidestand raising bracket before pulling the last screw).

Remove the bolts attaching the transmission housing to the frame, and then the bolts holding the transmission to the engine. Gently pull the transmission rearward (don't lose the shims that space it away from the frame!) with both hands, and don't let it fall onto the clutch pushrod. The transmission isn't that heavy, but get both hands under it for support so you don't drop it.

Once the transmission is out and set somewhere safe (i.e., the floor) you should be looking at the clutch assembly.

(**VERY IMPORTANT HERE**) I would use some white-out fluid to mark the locations of the clutch pieces relative to one another. Clymer tells you to note the factory marks, and after disassembling mine, I found out they weren't very clear. So I would suggest keeping track of how things are aligned before removing any more hardware.

Remove the six bolts holding the clutch pack together. You will need a hammer handle jammed between the clutch housing and the outer bellhousing to keep things from rotating while you do it. Remove the clutch parts and put them aside.

Using the same hammer handle, loosen the nut on the output shaft. This nut is torqued between 80 and 100 ft-lbs, and the whole bike will try to pivot about the output shaft while you do it. Be careful that the bike does not tip over. When you get the nut off, remove the washer too. Throw the nut and washer away, as you will replace them with new parts.

Tug rearward on the clutch housing and try to pull it off. I was not able to remove mine this way because there is an o-ring on the output shaft interfering with the removal process. I ended up working the clutch housing out a little, and then pushing the housing back in, and cutting the now exposed o-ring with a pocketknife. Later, when reading Clymer, I found this is how they do it too......so I guess reading the manual beforehand is a good idea. :)

Once the o-ring is out, the clutch housing comes right off. And you are looking at your leaky main seal. I tried snipping it to expose an edge to pull on, but this didn't work. I ended up cutting a piece of 2x2" six or seven inches long, and while bridging the transmission housing, pried the seal right out. Be careful to not touch the output shaft in any of your prying, yanking, or cussing because it is not designed to deal with side loading.

Once the old seal is out, clean and degrease the seal area, and tap in the new one. I again used the 2x2 to seat the seal and keep it from being pushed in too far.....*flush with the rear of the engine block is perfect.*

NOTE: BMW has changed the seal design and issued a change in the assembly depth for the new seal. The changes are described here and here.

Clean the clutch housing, lightly grease the area where it will mate with the main seal, and push it in until it bottoms. Work the new o-ring onto the output shaft with your finger, insert the new washer (raised lip pointed in) and the new nut (raised lip pointed out). Snug the nut down, and after jamming the hammer handle into place, torque the nut to 100 ft-lbs of torque (specified range is 97-102).

Before installing the clutch assembly, degrease and inspect the parts. Rob L. suggested bathing them in a soapy water solution, and using a toothbrush to scrub.....this works pretty well. After drying the parts, measure the clutch plate and make sure it is within factory spec for thickness and replace if required. My plate was fine, but I used a pocketknife to dig out the old spline grease that the soapy bath didn't remove, and trudged ahead.

Align the clutch parts using the marks made during disassembly. Install new clutch washers on the bolts, and lightly tighten until the clutch plate is secured. I first tried to align the friction plate and the diaphragm spring (the thing that you are pushing against when you pull in your clutch lever) by eye, and I couldn't get it to work, so I borrowed a clutch alignment tool. This tool made things a LOT easier for me. I would recommend having this type of contingency plan in mind before you even take anything apart.

After aligning the clutch parts and torquing the six bolts to 13.5-15 ft-lbs, apply a light coating of BMW #10 lube to the clutch plate spline and the transmission input shaft spline. Position the transmission such that the splines mate (sometimes turning the transmission output shaft to get the teeth to line up is required), and gently push the transmission on. I actually made some four inch dowel pins to rest the transmission on before installing, and this worked pretty good.

My transmission went in almost all the way, and I walked it in the rest of the way using the mounting bolts. I hooked up the clutch cable and voila! Clutch action! I torqued the mounting bolts, secured the transmission housing to the frame (don't forget the shims!) and torqued, reinstalled the centerstand and removed the saw horses, and was basically finished.

Reinstall the remainder of the items removed, fill the bike with the appropriate fluids, and ride the hell out of it.

K Engine Output Shaft Noise Diagnosis & Repair Procedure

By John A. Brown
January 2000

Indications: A buzzing created at higher engine RPM (2000+ RPM) originating from the alternator area of the engine. Initial thoughts might lead to checking the alternator bearing, which is a likely culprit. If this is NOT your problem, you most likely face loose or broken rivets in the lash gear assembly.

Special tools: gear puller, Uni-Moly C220 spray lubricant, Torx T30 bit for bell housing removal, calipers, torque wrench capable of 102 ft lbs torque for clutch nut.

Procedure:

I am going to start at the point at which the transmission is pulled off the bike since there is a FAQ already on performing a clutch spline lube which describes the procedure to get into the clutch area.

I won't duplicate information you can find in Clymer's and Hayne's manuals either, they do a good job describing how to remove key parts in this process.

You will need to remove:

1. Lower faring parts and front cowling
2. Seat
3. Gas tank
4. Side bags and mounts, topcase
5. Rear tire
6. Transmission
7. Muffler

Also, Drain oil from crankcase and remove oil filter, leave filter cover off.

Begin:

1. Remove the alternator and the alternator drive dog. The drive dog is a spline gear and will need a gear puller or similar pry tool to remove it.
2. Remove the clutch following the Clymer's instructions.
3. Remove the water/oil pump assembly following Clymer's instructions, BUT note that where Clymer indicates there are 6 bolts holding the assembly to the engine housing there are really 7!
4. Remove oil sump pan.
5. Remove the clutch bell housing, or "intermediate housing" as Clymer refers to it. To do so, you will need to take the weight of the engine off the frame by placing a transmission jack under the rear of the engine. Since the sump pan is removed, place a 2x4 on the jack and raise it to come in contact with the rear of the lower engine housing. Remove all the Torx bolts on the inside of the bell housing then remove the frame bolt holding the bell housing to the frame. Remove the bell housing.
6. Insert a bar or screw driver shaft into the water pump end of the output shaft. It should slide far enough into the shaft to ensure it will not slip out when engine weight is applied to it. Using crate straps, or similar strap (I used a cargo strap) loop one end around the output shaft, and secure it to

the frame. Loop another cable around the protruding bar (or screwdriver) end on the front of the output shaft and secure it to the frame. The absorber gear and idle gear are under tension and we do NOT want the tension to force the output shaft out on us when the lower engine case is removed! The rear crate strap is going to support the weight of the engine, when you remove the transmission jack… make SURE it is tight and secure!

BMW requires that the output shaft position be marked, with cylinders 1 & 4 at TDC, so that it can be replaced in it's original position. I do not see that this is necessary and, indeed, my output shaft popped out of position before I had a chance to mark it. I've noticed no adverse effects of just replacing it in any position. So, follow steps #7, 8, 11, 12, 15 if you wish to follow BMW's guidelines for realigning the output shaft and crankshaft upon reinstallation, it certainly cannot hurt! Also note: these gears have different names depending who you are talking to! The gear attached to the aluminum carrier is called: absorber gear, the "free" gear is called: lash gear, tensioning gear, or idle gear. I will use Clymer's terms: absorber and idle gear.

7. Remove the hall timing cover at the front of the engine to access the crankshaft.
8. Thru the hall timing area, turn the crankshaft COUNTER CLOCKWISE (as viewed facing the front of the engine) so cylinders 1 & 4 are at Top Dead Center. Mark the timing plate to indicate the TDC position.
9. Remove the transmission jack. You can now remove the lower engine case.
10. Clean the gear teeth (idle gear AND absorber gear) with contact cleaner, or a little brake cleaner on a cloth like I did.
11. Double check that cylinders 1 & 4 are at TDC.
12. Paint a reference mark on the teeth of both the idle and absorber gears that line up with the edge of the housing. You will need to realign these marks upon reinstallation.
13. Replace the transmission jack under the rear of the engine case and lift the engine just enough to take the tension off the crate strap.
14. Carefully support the output shaft and loosen the crate straps holding it in place. The output shaft bearing is held in place with Loctite, you may need to heat it up in order to remove the output shaft. Mine just dropped right off. Remove the shaft.
15. Scribe a reference mark on the aluminum carrier lining up with the painted mark in case the paint is removed while working/cleaning the assembly. Scribe the idle gear too.
16. Be VERY careful with the two gears, you do NOT want to score or otherwise damage the teeth!
17. Remove the circlip securing the bearing.
18. Use puller tool BMW #008400 and center support BMW #331-307 to remove the bearing. OR, use a gear puller like I did. A Sears combination 2 & 3 clamp gear puller worked just fine!
19. Check annular spring location pin on absorber gear for wear, it is known to wear a groove in it. If it's worn, there is a procedure to replace the pin (see below: Location Pin Replacement). Check the pin on the idle gear also. If worn, idle gear will have to be replaced.
20. Check the annular spring for wear and replace if necessary.
21. I would highly recommend replacing the needle bearing and main bearing, you don't want to have to come back in here if you can help it! They are not very expensive either.
22. Check the rivet heads. At first glance, mine seemed OK. I was expecting them to be visibly loose, mine were not. I took a pair of pliers and tried to turn each head, two were definitely loose. Placing one end of the rivet on a anvil, I tamped the other end flat to snug up the rivet, then reversed the gear placing the rivet head on the anvil, and inserted a phillips screwdriver in the other end, and tamped it to spread the rivet more. This fixed my buzzing problem.
23. Early model K bikes will have a tension spring between the main bearing and the idle gear. This spring was superseded with a shim. Discard spring and follow step #24 to select replacement shim. If yours has a shim, check that the shim is the correct size! Mine was NOT!
24. Checking the shim: Place the idle gear on the absorber gear WITHOUT the annual spring in place. Use a caliper to measure the height above the surface of the idle gear to the shoulder the main bearing rests on when pressed into place. Select a shim between 0.07 to 0.09 mm of this measured value. If you cannot find one within this range, which was my case, buy the closest

oversized shim and use emery paper to work it into tolerance.

Reassembly:

1. Spray all surfaces of the absorber and idle gears, and annular spring with Uni-Moly C220 lubricant. If you cannot find this lubricant, any spray Moly lubricant will work. Allow to dry. Check (dare I say it?) your Honda dealer and while you are there, buy some Honda Moly Spline lube! You'll need it for the clutch spline lube job!
2. Use circlip pliers and install annual spring followed by idle gear.
3. Install shim.
4. Warm main bearing in oven. I set it to 400 degrees and allowed the bearing to sit in the oven for about 20-30 minutes. Press bearing into place on output shaft. I used the old bearing lying on top of the new one for tamping it into place.
5. Install new bearing retaining circlip with dished side TOWARD the bearing. Use a drift to seat circlip into the retaining groove.
6. Clean the spline and socket engagement and spray with Uni-Moly. Allow 30 minutes drying time. Apply a coat of oil to the needle bearing and main bearing.
7. Preload idle gear. This is tricky! Do NOT pry on the teeth of the gears!!! You may damage them! Instead, use a blade screwdriver to pry against a rivet head and one of the holes in the idle gear. Have a pair of vice grips with several wraps of duct tape around each jaw to clamp the gears together when they are tensioned. You want to tension the idle gear so the teeth of the two gears are aligned.
8. Apply loctite 1110B to rear output shaft bearing and location ring.
9. Double check that engine is still at TDC.
10. Align the timing mark scored on the aluminum absorber gear carrier with the engine case and reinstall the output shaft. Check that location rings at either end are properly lined up in the engine casing.
11. Use crate straps to again hold output shaft in place. Make sure the rear crate strap holding the output shaft is tight enough to hold the shaft in place when under tension!
12. Remove vice grips from gear assembly. Check that the output shaft is properly meshed with crank shaft and has not slipped.
13. Prepare lower engine housing surfaces with 3Bond 1207B sealant (or equivalent). Allow 10 minutes to cure so solvents can evaporate.
14. Replace oil and coolant passageway o-rings in upper engine housing.
15. Align lower case with bearing location rings on output shaft. Place into position against upper engine housing and again ensure engagement of location rings.
16. Insert 2 hex bolts into rear 2 allen bolts in front of output shaft to secure lower case engine housing.
17. Torque the hex bolts to 40 Nm and the allen bolts to 18 Nm
18. Replace lower housing cover outer bolts and torque to 7 Nm

Reassemble remaining components.

The noise you will hear should now be different than before and will diminish as the new parts wear in.

Location Pin Replacement:

Note: I did not have to perform this procedure and merely include the procedure BMW specifies.

1. Mark location of pin on the inside of the aluminum absorber gear carrier.
2. Punch mark at the base where the new hole will be drilled to punch out the pin.
3. Use a 3mm drill bit and drill a hole in the aluminum housing ONLY! You will need a LONG bit to do so.

4. Press out the pin from the inside of the aluminum carrier using a 1/8" drift.
5. Coat new pin with loctite and press in to a height of 5 to 5.5 mm above absorber gear surface. To make this process easier, place a 5mm nut around the pin to act as a stop and drive the new pin in place.

Engine Output Shaft Diagnosis

By Spike Cornelius
January 2001

Author's Note: this follows the article: Output Shaft Noise Diagnosis & Repair - John Brown (January 2000)

Driving to work one day the engine suddenly stopped making my FY K100 roll. Output shaft rivet failure was my first thought.

I followed the same preliminary steps in the repair of my output shaft as John Brown, but following the advice of Haynes I removed the engine from the frame. This allowed me to turn the engine on the valve cover, making access to the lower innards much easier.

When the bottom came off, the heads of the rivets that secured the shock absorber to the drive gear fell out, confirming my diagnosis.

The first picture shows the difference in the new versus old driven gears. The second picture shows where to look to see if your rivets are loosening. The crankshaft cover can be moved out of the way without draining the cooling system by flexing the drain hose and swinging the cover on it. You will need to be careful when reassembling to get the crankshaft cover seal into its groove properly to prevent leakage, but I did not find it difficult.

Rotating the back wheel with the transmission in gear, while peeking under the back of the crankshaft should let you see if there is any play between the driven hub and the gear.

Repair a Weeping K-Bike Valve Cover

Seems I've got a leak in the lower rear corner of my valve cover. It's enough to mist oil my boots when I'm on a ride. --
1) Is this a common problem? Seems by it's location it might be.
2) Anyone have thoughts on a solution?

Yes! First, get your dealer to order up a fresh set of the rubber washers which sit under the valve cover bolts. The old ones dry out and compress over time. Also get a new rubber gasket (there are two of them, actually, as you will see when you remove the valve cover: a large one which seals the perimeter of the cover and a smaller one which seals the opening where the spark plugs fit).

Remove the valve cover and replace all the rubber washers. Clean the cylinder head mating surface COMPLETELY! A small drop of oil on the mating surface WILL allow oil to seep. It helps if you use a paper towel or whatever to soak up some of the oil which seems to sit in the cylinder head right at the mating surface.

Re-install the cylinder head and torque to about 5 ft-lb - if you feel the need to actually torque them - I just tighten them up until they're snug.

Note: If you examine these bolts, you'll see that they have a shoulder on them, to prevent you from crushing the valve cover by over-tightening. Tighter is NOT better!

That should solve the problem. As an Added Bonus(tm) you can put a dab of an ACID-FREE (if it smells like vinegar, it has acetic acid in it: don't use it!) RTV on the seams where the front cover mates to the cylinder head. BMW Drei Bond/Yamabond4/Three Bond (3 names for the same stuff) is a good choice.

Changing Alternator Drive Bushings on a K75

By Ted Verrill

Parts You Will Need:

3 Alternator Bushing Sets, Part # **12-31-1-460-306** (~$9.00)

Parts You MAY Need and Should Probably Have:

1 Alternator Drive Clutch Part # **12-31-1-460-302** (~$8.00)
1 16 mm Spring Washer Part # **07-11-9-933-155** (~$0.70)

Tools/Things You Should Have:

1 Tube Dielectric Grease
1 Lubricator s/a Armor All
1 tube Red Loctite

For the Battery Tray and Mounts:

4 Battery Mounts, Part # **61211233028** (~$1.20 Each)
4 6mm Wave Washers (~$0.15 Each)
4 6mm Nuts (~$0.15 Each)
1 Krylon Spray Paint Black (~$3.50)

Procedure:

Part I: Disassembly

Put the bike on the center stand.
Remove the seat.
Whenever I do a job like this I use a clear plastic multi-compartment box to keep all of the screws and circlips both separate and in one place. Try Wal-Mart, around $3.00.
Remove the alternator shield (2 hex bolts)
Remove the computer and the housing.
Remove the coolant overflow tank.
Carefully examine your overflow tube at the overflow tank connection, mine was so dry-rotted it almost broke in half!
Remove the battery.
Check your water levels while the battery is so accessible!
Remove the battery tray (and mounts if have decided to replace them.)
Disconnect the alternator electrical connection.

Then, Remove the three 6mm allen bolts that hold the alternator.
An Allen extension is quite handy on the top and especially the bottom bolts.
Optional: *Remove the battery tray. Remember that removing the battery tray makes removing and replacing the bottom bolt much easier, plus yours probably needs new nuts, bolts, mounts and a good repaint like mine did. Brush down the battery tray with a wire brush to remove old paint and oxidation. Wash it with a really good scrub-brush and a good cleaner (I used Simple Green), and thoroughly dry it.*

To paint the tray, hang it from a stretched-out coat hanger through one of the mounting holes and repaint it using newspaper behind/below to catch stray paint.
Carefully pull the Alternator slowly out, toward the back of the bike. Make sure to remove any bits and pieces of the alternator clutch or old bushings that fall out.

Part II: Examination

Remove and examine the bushings. If they are deteriorated, melted, or even missing you will have to very carefully examine the alternator clutch. You may even want to eat the $8.00 to be on the safe side and replace the Clutch anyway. Carefully examine the alternator clutch fins as well as the driven gear that engages the clutch (a flashlight helps here.) The Alternator Clutch Fins may have very fine hairline cracks, or may be bent, in either case you will have to replace this inexpensive part. If yours is fine and you don't want to replace the alternator clutch, move on to Part IV.

Part III: Remove & Replace the Alternator Clutch

Remove:
To remove and replace the clutch, insert an allen wrench through an angle-head box-end wrench and into the shaft. Hold the allen wrench steady whilst removing the nut with the box-end wrench. This is a little difficult and requires careful application of elbow grease. When the nut is off, remove and discard the spring washer and lift off the clutch. Watch carefully at this point for the Woodruff key. I have been told the key is not needed and in fact many K bikes don't even have it. YMMV.

Replace:
Position the Woodruff Key (if using it) and place the new Clutch onto the alternator. Place a new spring washer on the alternator shaft over the Clutch and use a little Red Loctite on the shaft threads before hand tightening the nut. Tighten to the correct Torque setting (I have no torque wrench so I just tightened it until I felt the spring washer had compressed, in other words "real tight".)

Part IV: Replace Alternator Clutch Bushings, Remount Alternator.

Position the three alternator bushings in the alternator clutch and at each juncture where two bushing "pods" meet (where the alternator drive's fins will engage) apply a small amount of lubricant (I used Armor-All and it worked quite well though I hear spit will do in a pinch.) On the outside of the alternator clutch you will see three marks, each at a spot where the alternator drive's fins will insert into the alternator clutch bushings.

Here it really helps to have a partner on the other side of the bike to hold the alternator steady while you line up the clutch, and then hold the clutch steady and lined up while you gently push the alternator onto the drive.

First, line up the alternator so that it does not need to be rotated in order for the three mounting bolts to be replaced. Second, rotate the alternator clutch such that one of the three marks is lined up with one of the three drive fins (again, a flashlight is handy here...) Then simply slowly and gently push the alternator into position. You will feel a little resistance at first, but the alternator should evenly slide right onto the drive fins.

Repeat this procedure if necessary...

Tighten the mounting bolts to spec (again, "tight") and clean, lube with dielectric grease, and reattach alternator electrical connections. Reassemble in reverse order (remembering to replace the battery mounts, and to clean and lube the battery connections with dielectric grease.)

PART V. Go For A Ride!

NOTE: You may want to inspect/replace the alternator brushes. It is simple, but not covered here...If you have had any charging problems, do it.

K-Bike Alternator Drive Rubbers

By Don Eilenberger
April 1996

Went and did the drive rubbers (we'll call them goobers for clarity) on my K100RT last night - I think the results were what I hoped for, but won't know until later today when I take it out on the road.

Approx time:

- no lily gilding - maybe 1-1.5 hours
- w/ lily gilding - about 3 hours

Special tools needed:

1. Metric allen-drivers are good things to have, with 3/8" drive and 2" and 6" extensions
2. Normal metric sockets
3. Normal metric allen wrenches
4. Phillips and regular screwdriver

   In addition - for lily gilding, small stainless brush
   for cleaning aluminum surfaces, sandpaper (120 grit is good)

Parts needed:

1. Rubber drive goobers (3 needed - cost ~$2/each/US
2. Replacement nuts or washers for any you are likely to drop.

   In addition - for lily gilding, can of Wurth Silver
   wheel spray paint. Can of black glossy spray paint.

Step 1. Remove everything in the way of the alternator

1. Remove battery side panels
2. Disconnect ground lead from engine
3. Take one end of seat holder-open off - so you can open the seat a bit further (lift off seats - this doesn't apply)
4. On right side of bike - remove pin holding computer in place.
5. Slide computer towards left side - disconnect main connector (this is much easier than how the book tells you to do it - thanks to Corky Bessette for this tip).
6. Remove computer
7. Remove plastic housing computer is held in.
   ----
   *LILY GILDING - take housing to laundry room sink and
   wash.
   ----
8. Search for any of the four rubber thingies the housing sits in - they will travel to the same corner

of the garage the little red tubes that come with spray cans like to hang out in.

9. Remove battery holddown (two long phillips screws)
10. Remove wires from positive side of battery
11. Remove battery vent hose L fitting from battery
12. Remove battery from frame
13. Remove battery tray from frame (on early bikes, you must disconnect the rear brake reservoir from the battery tray - it can stay connected to the master cylinder). Four 10 mm nuts hold the tray in place

    ----
    *LILY GILDING: You can now clean up and paint the
    battery tray and the battery holddown.
    ----
14. Move coolant overflow tank out of the way (you don't need to disconnect or drain it - but try to keep it upright more or less)
15. Remove plastic side cover over alternator - two allens
16. Disconnect main connection from alternator - this plug pulls straight out towards the rear of the bike (it looks a bit confusing - ask me how I know!)
17. Remove 3 large allen bolts holding alternator in position (one is more or less hidden between alternator and starter)
18. Pull alternator towards rear of bike and remove from bike
19. Remove old goobers

    ----
    *LILY GILDING - at this point, you can clean everything
    in sight. I'd resist painting the alternator, but a good
    cleaning with a stiff brush is in order. Do not allow
    dirt or metal particles to get inside - this would be
    a bad thing. Also a good time to check your brush length..
    two screws on white part with transistor on it. See
    books for acceptable lengths (this part is a common
    Bosch part - used on all newer bosch alternators - it
    can be purchased from sources other than BMW moto dealers)
    ----
20. Lightly grease new goobers (I used silicon vacuum grease - they should now last forever)

Step 2

Assembly is the reverse of above.. check the alignment of the new goobers with the 3 fin drive flange on the bike - there are cutout marks on the alternator portion to help you line it up (this isn't mentioned in any manual I've found, but was obvious to me once I tried to figure out HOW to line them up).

When done, start bike and listen to quieter engine! (at least it seemed like this to me at 12AM last night..)

Step 3

Reset clock if you have one when done.

Best..

==========================
Don Eilenberger
deilenberger@monmouth.com
==========================

Alternator Drive Dampers Tip

By Frank Glamser
January 2000

I'd like to submit a brief tip to add to Don Eilenberger's article on replacing the alternator drive dampers on a K-bike.

The hardest part in replacing the rubber alternator drive dampers is lining up the damper holder with the alternator drive vanes. It is impossible to see what you are doing as you try to mesh the two parts.

Two things can make things much easier.

Using a felt marker, mark the outside of the damper housing where the gaps in the goobers are located so you will know where the vanes will slide in. Using the rear wheel and fifth gear rotate the engine to place one of the drive vanes in the 12 o'clock position. Now you will know where the vanes are, even though you can't see them.

Rotate the damper housing to place one of the gaps at the 12 o'clock position, and then visually guide the alternator into place using the mark and your knowledge of where the vertical vane is located.

The silicone grease Don Eilenberger recommended will help hold the goobers in place during the operation.

Frank Glamser
Hattiesburg, Mississippi
1992 K75RT BOOF #136
Mississippi tag IBMWR

K-bike Oil Sight Glass Replacement

By John McClellan
January 1998

Replacement of the oil sight glass is not covered in the Clymer manual, so, based on input from various and sundry presidents, and my own experience, I performed the replacement as follows:

1. Put the bike on the sidestand so that the sight glass is facing slightly upwards. If the oil level in the engine is no more than full, you shouldn't lose much when you remove the old sight glass. You may want to drain about half a liter out first, just to avoid running oil all over the cooling fins.
2. If you have a hand-drill, drill a small (1/8-inch) hole in the sight glass. Drill slowly, taking care to remove the plastic cuttings (from the drill bit and the sight glass) frequently, so they don't end up in your oil pan. Drilling the hole may help prevent shattering the sight glass and creating loose shards during subsequent steps.
3. Tap the sight glass with a standard (flat blade) screwdriver, using a hammer or mallet, to crack the sight glass. Avoid hitting it so hard that you drive the screwdriver into the sight glass' metal backing plate.
4. Once you have a few cracks in the sight glass, remove as many pieces as possible with a needle nose pliers.
5. The sight glass assembly includes a metal backing plate which is held near the sight glass with a gasket and a spacer (appx. 1/4-inch). The backing plate has holes perforating it to let the oil through. Take a 3-inch wood screw (appx. 1/8-inch diameter) and twist it a few turns into one of the perforations.
6. With a claw hammer (or maybe a "WonderBar"), slowly pry out the sight glass assembly via the wood screw. You may need to put the wood screw in a second location to work out the sight glass. Also, use a small piece of plywood as a backing piece for your prying tool.
7. Once the sight glass assembly is removed, check for debris in the area from which it was removed.
8. Rub some fresh oil on the gasket of the new sight glass assembly and press it in by hand as far as possible. Seat the assembly the rest of the way using a large socket as a drift, or by tapping it in around its edge in a star pattern (as you would tighten lug nuts) with a large plastic bolt or similar special tool. The sight glass assembly will stand out about 1/32-inch above the engine casing.
9. Run the bike a while and check for leakage.

When I performed this, it took me approximately 20 minutes. I hadn't done it before, and I took time to be careful not to allow debris into the engine. As always, your mileage may vary.

John McClellan
Arlington, Washington
'85 K100RT

K1100 Crankcase Vent Repair

By Dave Soine
April 1998

"Say, what's that oily, spooged up tube sticking out of the backside of my KLT airbox?"

The crankcase vent tube attaches to a right-angle fitting on the top rear of the engine block, near the "bell housing" - you can see it by looking behind the coils on the left side of the bike. The rubber tube ages and cracks, leading to an excess of spooge, and possibly excess hydrocarbons (gasp!) being inadvertently leaked into our atmosphere! Being the anal, eco-sensitive types that we are, of course we must replace it. But how? The other end of the tube disappears somewhere inside the airbox!

Wherzat thing go, anyway?

To sum it up, the crankcase vent tube transports crankcase gases, along with a bit of engine oil, to a small chamber inside the top section of the airbox. The chamber somehow (magically) separates the oil from the crankcase gases. The oil is returned to the engine via the "oil return" line running from the front of the airbox to the fitting on the top of the engine block(at the front, next to the cam chain cover.) The now oil-free crankcase gases are distributed to the throttle bodies(!) via the "air return" line from the front of the airbox, allowing those evil hydrocarbons to be burned away in the combustion process.

As an added bonus, since the crankcase vent lines go to the throttle bodies, if they are cracked it could lead to poor idle just like any other air leak in the intake!

Part I: Inspection

1. Crankcase vent tube

    Locate the crankcase vent tube - you will need a light. Look for a rubber tube (~2 cm diam.) clamped to a fitting on the engine block and entering the top section of the airbox. About 6 cm is visible - use the light and look behind the coils and Throttle Position Sensor.

    An aged and cracked tube will be obviously oily and dirty.

2. Air and oil return lines

    Check these when you inspect your air filter - they are a bit hard to see without the right lower fairing removed. You will find these lines attached to the front (i.e. facing the radiator) of the top section of the airbox.

    Again, failing lines will be obviously oily and dirty.

3. Fuel lines, air filter

    Inspect (as best you can) and determine if you want to replace these - there will never be a more convenient time to do so.

Part II. Replacement.

Because of BMW's use of non-reusable type hose clamps (like the clamps used on cage CV boots), you could work hard to find a bunch of hose clamps to replace the ones that will be destroyed during removal of the old lines. It will probably take less time and effort to order the OEM clamps and buy a small pair of end cutters to install them.

Parts needed:

1. Any lines that need replacing. All of mine were bad. You will not believe how difficult it will be for your BMW dealer to figure out what the right parts are. It took *WEEKS* when I did it, so to avoid a big waste of your time, here are some of the part numbers: Important part #s for K1100s (US, anyway):

Crankcase vent tube:	??? <= THEY can find this one
Air return:	11-15-1-461-834 US$44!
Oil return:	13-31-1-461-971
Cheapo alt:	8x13 fuel hose (1.5 ft, cut to size) the OEM line has a 90 deg bend at one end

2. Hose clamps
    - for intake tubes you need four(4) -

Hose clamps (OEM):	11-61-1-460-900 (one time use)

    - for the vent tube and oil return you can use small hose clamps, found at any auto parts store, in place of the 15.7 mm and 17.5 mm clamps

    - for the air return, you need:

four(4) of:	17-11-1-460-922	12.3 mm one-time
two(2) of:	???	15.7 mm one-time
two(2) of:	16-12-1-180-241	17.5 mm one-time

Extra tools:

1. Small nut drivers will be helpful, 7 mm for sure.
2. I used a flat-blade screwdriver bit from my socket set.
3. Some type of tool to cut the old hose clamps. Sturdy "dykes" will work.
4. If you use the OEM hose clamps, a small end-cutter (nippers) works great, especially in the small working spaces this job requires.

Procedure ("Spartan" overview):

1. Remove left and right fairing lowers, and
2. Remove right fairing bracket (at bottom of airbox.)
3. Remove the airbox.
4. Replace all the vent system lines (air and oil).
5. Install airbox.
6. Install right fairing bracket and fairing lowers.

Procedure (detailed instructions):

1. Remove the both left and right side lower fairing.

Starting with the left side:

2. Disconnect the electrical accessory socket (connector on the back of the socket) and remove the plate holding the socket (2 phillips screws, attaching to the coil bracket.) This will allow easier access to the crankcase breather tube.
3. Now for the destructive part. Carefully cut the hose clamps which attach the intake tubes (from the airbox) to the top of the throttle bodies. Be sure to recover all the metal bits that will fall into the throttle linkage, etc.

Now to the right side:

4. Remove the fairing bracket that attaches to the block near the bottom of the airbox. (10 mm bolt)
5. Remove the front intake tube (2 - 8 mm bolts).
6. Loosen the hose clamps on the oil and air return lines on the front side of the airbox and detach the lines. A section of the air return line may come off as you do this (OK). Have an oil rag handy, as all these lines could drip a bit.
7. Disconnect the wires for the air temperature sensor (connector on the rear of the airbox). Pop the spring clips (3!) and remove the air filter.
8. Reach through where the air filter used to be and loosen the hose clamp(7 mm - ratchet) which attaches the crankcase vent line to the engine block - there is not much space! If your nut driver, screwdriver, etc. won't fit you can get a bit more space by propping up the rear of the fuel tank (remove the clips first if they are still there) and pushing up the electrical box a little. Watch out for the fuses!
9. Pull the vent line from the fitting. Have a rag handy for when it drips oil.
10. Pull the intake tubes off at the throttle bodies. Try not to get too much dirt in the throttle bodies. :)
11. Remove the top section of the airbox, then the bottom, from the right side of the bike. Cover the throttle bodies with a rag so no dirt falls into them.
12. Flip over the top section of the airbox - you will see where the crankcase vent line attaches. Note the orientation of the old vent line (the "engine" end), then cut off the old hose clamp and pull off the line. Pull it out of the airbox and replace it with the new one - make sure the new line seats properly where it enters the airbox. Use one of your new hose clamps, of course.
13. Cut the hose clamp on the oil return line and detach it from the fitting on the block. Removing this line is a real PITA, you might just want to cut it off. This fitting may come off when you do this - no worries, just put it back in upon reassembly, with some gasket sealant. Attach the new oil line to this fitting, again with a new hose clamp.
14. Carefully cut the old clamps attaching the air return line(s) to the throttle bodies. Remove the old air return. Note where the piece of foam-rubber heat barrier is located so you can put it back later.
15. If you want to replace the fuel lines, do it now. One line is specially formed and can be obtained from a dealer, the other two are just 8x13 fuel line, cut to length. You will need some new hose clamps, as usual. :)

Reassembly:

16. Assemble/add clamps on the new air return (this will be obvious upon looking at the old one, using 15.7 mm & 17.5 mm clamps) Take care to properly align the two parts of the air return.
17. Install the new air return. Make sure to push the lines all the way on to the nipples on the throttle bodies, and use the 12.3 mm hose clamps.
18. Install the little piece of foam-rubber heat barrier.

19. Put the clamps in place on the intake tubes attached to the top of the air box.
20. Put the bottom section of the airbox back into place (watch that oil return line!) then the top section. Slide the intake tubes over the throttle bodies or at least get them close. Make sure the clamps on the intakes are in place! Also watch and insure that the foam-rubber heat barrier that lays on top of the airbox is in place.
21. Finally, slide the crankcase vent line (with the clamp) over the fitting on top of the block and, again reaching between the sections of the airbox, tighten the clamp on the crankcase vent line. Your cursing will really become creative at this point.
22. Push the intake tubes all the way onto the throttle bodies and tighten the clamps.
23. Install the air filter(be careful to orient it properly!), air and oil return lines (at the airbox) and temperature sensor connector.
24. Install the fairing bracket and intake tube (9 Nm).
25. Double check to see that everything is in place. Install the fairing lowers, etc. and anything else you had to remove.

That's it! I noticed better idle after replacing the lines, probably due to the leaks in the old vent lines.

Early K100 Sprag Clutch Cleanup

By Don Eilenberger
September 2000

The Finest Year ('85) and earlier K100 has the first design sprag clutch - and it's problematical if the technique I describe will help - but easy and cheap to try. It's also possible that your sprag clutch has accumulated moisture causing rust of the components (one of the problems with short winter rides) - and in this case disassembly is probably the only answer. (BMW changed the design in early '85 due to exactly this problem - the new design helped but did not entirely 'cure' the problem - it still occurs once in a while on K engines).

OK - the process I've used with success (and it has worked about 60% of the time for other people - no guarantees)

Go to a local auto parts store and look for an oil additive which describes itself as a 'detergent' - we do NOT want any oil thickeners (like STP) - we want something that says "Cleans rings, hydraulic lifters, etc.." "safe to use in your oil" - we are not looking for an engine 'flush' - we're looking for a very specific oil detergent additive.

I personally have had very good luck through the years with a product called CD-2 Oil Detergent. Paul Glaves and others have used a product called Rislone with success.

With CD-2, (make sure it is the 'detergent') - I added 1/2 a can to a fresh change of oil - and then ran it for 500 miles and then changed the oil. Any of the detergent additives tend to dilute the oil, so I don't like to make it part of the bikes regular diet. With CD-2, you could add it even if you were full up on oil - the can isn't very large. Rislone comes in a quart, so adding even 1/2 of it might require lowering your oil level somehow.

The brand of oil you use may also have some effect on this behavior.. I find I've had good results with Castrol RX-Super 15-40 fleet oil.. I'm sure that any quality oil will help avoid the problem, as will longer rides in the winter to allow the oil to come up to temperature and burn off moisture.

K75 Overheating

Things to check for an overheating K75

From the BMW list:

Date: Thu, 13 Apr 95 18:01:07 MST
From: Rob Lentini <roblentini@cox.net>
Subject: BMW: Re: Art Jacobson's Hot Ks

Art: It is unusual for K75s such as you and Katherine ride to get so hot to the touch, as you report. Things to check:

1. Verify operation of the cooling fan. Start the bike up and let it fast idle until the fan kicks in--about 10-20 minutes depending on outside temp. These fans are known to seize up and burn the commutator brush assembly. Clue? Your horn doesn't blow because the fuse that powers it and the cooling fan is blown due to the seized fan.

2. Change the fuel filter in the tank. A plugged filter will slow down (eventually stop) fuel flow and overheat the fuel in the lines and fuel rail, giving you the "boiling" sounds you hear, and will eventually cause vapor lock.

3. Install the foil-like heat insulator blanket on the underside of the fuel tank. Common on K100s, many K75s didn't come with it.

4. Ride faster!

Rob Lentini
'87 K75S
Tucson, AZ

From: joe@mpd.tandem.com (Joe Senner)
Subject: Re: BMW: K-Bike Overheats!
Date: Wed, 31 May 1995 10:28:57 -0500 (CDT)

```
]I heard a muted "pop" and noticed steam rising from the right side
]of the bike and hot coolant running down my pant leg. I pulled off
]to the side of the road and as I did so the "hot" idiot light
]came on for the first time. There appeared to be about a quart of
]coolant in the road....
]pressure-relieved itself. Now I'm not so sure...why was the overflow
]cap seemingly blown off, especially considering that it's got a vent
hole?
]Why no idiot light until AFTER the incident occurred? Any theories
here?
```

you've probably gotten a bunch of answers to this already, I'm so far behind in my mail, oh well, I'll pipe in anyway.

things to check:

- 1) the fan. make sure it turns _freely_. spin it with your hand to make sure.
- 2) the fan circuit. check the fuse. [same circuit as the horn - wd]
- 3) the radiator cap valve and seal. pull the radiator cap and check the rubber seal on the bottom. it should fit well. make sure the screen in the bottom of the cap is clean. I wipe mine off and try to blow/suck air through it. you should have easy flow when sucking on the cap, but you shouldn't be able to blow air through it. this lets coolant into the system easily but makes sure it's pressurized to get out.
- 4) pull the reservoir tank hose off at the cap and blow on it. make sure it's clear. look for bubbles in the reservoir when you blow on it.
- 5) brush your teeth after 3 and 4 above. yeech...
- 6) make sure the level in the reservoir itself is _correct_. as the bike heats and cools near the extremes it's going to be using that tank. too much to start with and you can expect some overflow.
- 7) make SURE SURE SURE your coolant is fresh, AND mixed properly. if in doubt, change it! use the correct antifreeze! many US sold brands have additive packages designed for cast iron engine blocks. this does NOT work well with a full aluminum system! this US trend is changing, but better safe than sorry. I never let my AF go over 1 year old, and always use distilled water in the system (except when flushing).

one thing to remember about K bike idiot lights is that the sender for the light is mounted near the bottom of the cooling system as a whole. this means it's going to get a reading from the coolest point in the system. the other thing to remember about idiot lights is that they are just that, idiot lights, and are simply a guide. knowing when your fan should be on and isn't is a better warning system.

--
Joe Senner

From: "keith (k.p.) hanlan" <KEITHH@BNR.CA>

I just wanted to one more item:

- A cracked breather hose can introduce unmetered air causing the engine to run lean. This breather hose is a short S-shaped hose running from the secondary airbox above the throttle bodies down into the crankcase.

[FWIW- I had mine replaced under warranty - wd]

Thanks for the service you are providing.
Regards,
Keith Hanlan KeithH@bnr.ca Bell-Northern Research, Ottawa, Canada 613-765-4645

The Making of the Inexpensive Brake Pressure Bleeder

Back in early 1999 I mentioned on the Digest(s) that my own personal brake pressure bleeder was made from a pump-up garden sprayer and some hose, a few fittings and a master cylinder cap drilled to accept another air fitting. I lent mine out to a fellow employee who liked it so much that he asked to buy it. After making a tidy $25 profit, its now time to make another one. So here we go fellow cheapskates, if you can't afford Steve D's most excellent Bleeder Cap or have learned from experience not to accidently apply 125 PSI to your master cylinder, here's my $25 or less do-it-yourself pressure bleeder. Have an Ace Hardware in your neighborhood? You can do this.

Update I: At the Laguna Seca Driving School held 11/20-21/99 I lent my bleeder to Jay Sala. Jay was just bleeding his brakes and therefore didn't have a turkey baster with him. Why is that important? Well, most of these bleeders leave the master cylinder topped off with fluid and you need to suck out the extra fluid to get it down to the fill level line. Jay and I didn't have a baster handy. So, I made an improvement to the bleeder today to cure this little problem. Look at the last picture and instructions. I also splurged an extra $2.99 at Ace Hardware for a pressure gauge. The proper operating pressure is 15-20 psi.

Update II: A few people over the last year have asked me what to use to catch the brake fluid in when bleeding brakes. I've always told them to use a one or two liter Coke bottle with some kind of hanger to hold the bottle while you open the bleeder screws. Since I broke my bottle today, I had to make a new one. Look for the update at the bottom of the page for pics.

Update III: Michael Kim wrote to say he had made a copy of the bleeder for himself, adding a quick release coupling to the unit. While this would put the cost of making a unit slightly above the $25 goal I set for the device, it's a worthwhile upgrade. See the bottom of this article for the letter Michael sent me with the parts list and a picture of his version.

Ok, here's where we start. 1/2 gallon size pump up sprayer from Ace Hardware (Model# 74497).

Next step, loosen ring connecting spray head hosing. Save in case your wife finds out what you've done and makes you put her rose sprayer back in original condition.

Now that you've loosened that pesky ring, cut the hose off if you can't get it to slip off. Then slit it down the side and peel it off. Set the original hose aside in case you ever want to reuse this thing as a sprayer. If so, remember to clean it ***real*** well first.

Yes its true. You can use a late model GM master cylinder cap (Help! p/n 42035). You have to take 5 seconds to modify it but it works fine after that. What you will find when you open the package is that the GM piece has a little groove cut in the underside of it to relieve pressure!?! I don't know what the hell that's about, but take some black (or whatever) RTV and using a scrap of the original packaging, smear the groove full of RTV and let it cure for a bit.

I didn't take pictures of every last little detail. Sue me. While at Pep Boys buying the cap, get a 1/4" hose fitting with a threaded base and associated brass nut. I also used a fender washer from my spare hardware bin on top. Drill a whole and enlarge to the size of the hose fitting. Screw that baby in there and secure from the back (see next pic) with the brass nut.

Yep just like that. Too bad it was sunny out and the flash didn't light up the inside where I put black RTV on black plastic. You would have been real impressed with the overwhelming difficulty of the job.

I left this pic full size. I imagine you can double click on the others and see them this size if you want. Connect 6 feet (or whatever you feel like) of 1/4" I.D. (for this sprayer) poly hose to the sprayer and cap. Secure with hose clamps. That is all there is. Under $25 and you are good for years, or until you sell it at a profit to a friend. Here's how you use it. Pour in 1 to 2 liters of Super Blue or Type 200 ATE brake fluid and after sucking old brake fluid out of master cylinder with your wife's best turkey baster, refill and screw the cap on. Pump it up to pressurize and start bleeding brakes. After you're done, loosen main sprayer cap ***slowly*** to relieve pressure. Suck out or fill up master cylinder to full level line and reinstall factory cap and sensor.

Update I

Here's the improvements to the bleeder. Take a small length of 1/4" OD (for the hardware I used) copper tubing and attach to the inside of the cap using either a ferrule and cap or JB Weld epoxy. I did both, just to be sure. Trim to the proper length so that when the cap is installed onto your master cylinder it will just reach the fill level line. Then when you are done flushing or bleeding your brakes, loosen the cap of the pressure bottle. You must have the bottle below the level of the master cylinder. When you do this, you will syphon the fluid back into the reservoir from the master cylinder. The fluid will syphon down to the end of the copper tubing where the syphon's vacuum will be broken and your fluid level will automatically be correct. I also drilled the tank to accept a small air/fluid pressure gauge. This will help first time users set the proper pressure of 15-20 psi when pumping the reservoir up. RTV (Silicone) the gauge in place also to make sure its air tight.

Update II

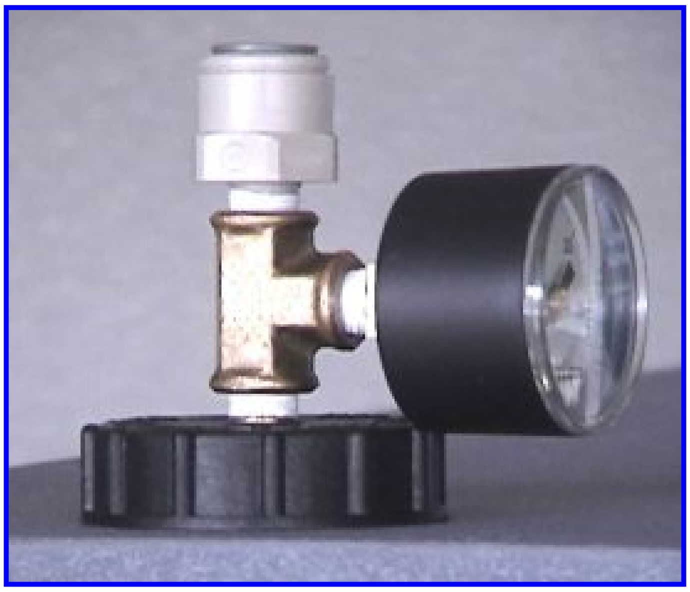
Here's the finished product. Use about a 1/3 of a coat hanger or anything else you like to make a hanger. Twist a loop into it around the neck of the bottle and squeeze it closed with a pair of large pliers.

Get yourself about 4-5 feet of 1/4" OD (outside diameter) tubing at a hardware store. Drill a hole in the bottle cap to accept it and push it about halfway into the bottle. You want the tubing to hang above the fluid draining in so you can see when it runs clean and without bubbles. When drilling the cap, it will work best to start with a small bit and work up. Using a large bit first will probably result in the bit catching in the hole and spinning the cap. And since I know all of you will drill the thing holding it in your bare hand, we wouldn't want THAT!

Update III

I purchased my union joint at ACE for $3.99 called a "3/8x1/8 INSTA" "PUSH MALE CONN", but Mcmaster sells it for $2.62 "51055K16". Perhaps a nice upgrade for those that plan on using the bleeder frequently. Here's a photo, notice I put my gauge on top of the cap, instead of on the bottle. The 3/8OD tubing simply slides into the grey connector on top, and swivels, or can easily be pulled out. It's sealed with an O-ring, and rated to over 100psi.

Michael Kim



Note: This is the cap that screws onto the Master Cylinder

Happy Brake Bleeding!

Return To My Hompage

How to Change Brake Fluid

or Bleed your Brakes

From: joe@senner.org (Joe Senner)
Subject: Re: BMW: Bleeding ABS I Brakes
Date: Wed, 16 Aug 1995 17:41:49 -0500 (CDT)

]a) Do I bleed the modulators before or after the calipers. My impression from
]the Haynes manual is that the modulators are first but I'd rather ask the
]experts (and I got confused moving back and forth between the chapters).

You'll want to pull new fluid from the master cylinders (hand/foot) through the system, extracting at two points, the modulators and the calipers.

Drain or otherwise extract the bad fluid from the reservoir. I soaked it up with a wad of paper towels. You don't want to pump more bad fluid through the system. Refill with new fluid.

Set the lid back on, or cover with a rag. When you pump the lever, fluid will squirt out!

Watch the fluid level and _don't_ let it go dry. You're starting over if that happens :-)

Attach your drain hose to the modulator bleed screw and crack it open with a 10 mm wrench. If you're using just a plain old hose to bleed with, apply pressure to the brake lever and crack the bleed screw open just a little until fluid begins to flow. Close the bleed screw _before_ your lever is all the way to the end of its travel. This prevents you from sucking air back into the system.

If you're using a valved drain hose, you can pump the brake lever at with the bleed screw cracked open slightly and get the fluid flowing. The one way valve will prevent fluid/air from sucking back in when you release the lever for another pump. The valved bleed hose works best if you put some teflon tape on your bleed screws (removing them all the way, obviously). I've done it without though.

If you've got a vacuum bleeder, start sucking on the nipple until you see clear fluid :)

When you're getting clear fluid out of the modulator, move your hose attachment to the caliper and go at it again.

]b) How much DOT 4 brake fluid am I going to use (more or less)? I don't want]to run out halfway through the job.

I didn't use all of one normal sized bottle, can't remember how many ounces, but they're common. Not much bigger than your hand. 1 pint?

]c) Are there any common errors/ "gotchas" that I should know about before I]begin?

Brake fluid eats paint. Just keep that in mind, and take your time.

--
Joe Senner
K Whiner MC#3

Timing Chain Rattle Diagnosis

By Colin Carpenter
November 2001

I'm so pleased that I eventually managed to cure this annoying rattle, that I just feel I've got to tell someone about it.

My bike is a 1986 K75C that I've had for about 10 years now. I bought it from a local dealer, and the bike had a full service history and had been owned by a local motorcycle enthusiast who had owned it from new and put 33,000 miles on the clock in the 4 years or so that he had owned it. (His "other bike" is a 1977 MV Agusta!!) It had been run on fully synthetic oil for all of this time ..... a clue to the chain ticking, as will be revealed.

The bike looked and sounded good, though at the time I remember thinking that the " tappets sounded a little noisy" ... but as I knew very little about K series engines at the time, I assumed that a small amount of adjustment would cure the problem. Little did I know that it would take me 10 years or so to cure the problem!

Once the initial "buzz" of owning a new bike had passed, I decided that I ought to try and cure the noise. A Haynes workshop manual and a feeler gauge determined that there was nothing wrong with the valve clearances, and a "screwdriver stethoscope" indicated that the noise was in fact coming from the the timing chain area of the bike. It was most noticeable at tick over, though was also audible at low speed (even through a helmet and ear plugs) when the bike was cold. When fully warmed up, it was still there, but not so bad. The only time the bike sounded perfect, was when it was started up in the depths of winter, when for the first minute or so, it ran like a sewing machine, but as the oil warmed up, the ticking appeared until it sounded as bad as normal.

It annoyed me intensely, as the rest of the bike was so good, but the engine sounded like a bag of nails, so I decided to replace the timing chain, tensioner and all the various plastic slides that keep it on track.

Being somewhat "fiscally bereaved" at the time, I thought I'd strip it down first and check the chain for wear. I did this and found that there just wasn't any noticeable wear in the chain at all, so I kept it and just replaced everything else. You've guessed it .... it made not a scrap of difference!!

Then followed an 8 year hunt to try and find out what was causing it. The internet, dealers, mechanics, specialists etc., were all quizzed, but no one could shed any light on the subject, so I just put up with it and bought quieter ear plugs.

This year, I decided that it was annoying me so much that I was either going to sell the bike (which I really didn't want to do) or get to the bottom of the problem. The only bit I didn't change at the time was the chain itself, so it had to be that ..... didn't it?

So I coughed up the money, bought a new chain (and all the plastic wear strips and gaskets), stripped it down again, measured the new chain against the old and could not find the slightest signs of wear (even after 60,000 miles). At this point, I just knew that when I put it all back together, it was just going to sound exactly the same as it did before, so I calmed down, and started to try and rationally analyse what was causing it. 30 minutes later, I had one of those "Eureka" moments .... one of those moments that stay with you for the rest of your life ...... one of those moments when suddenly everything becomes clear. I found the problem!!

The problem was in a part that is not normally replaced as part of a timing chain strip down. In fact, it's not normally even held by dealers and has to be ordered from BMW direct, unless you can get a second hand one as I managed to do.

This part is the long curved piece of flat section bar that is pivoted at one end and is "pressed on " (from the underside) by the hydraulic, ratchet tensioner. This part has a plastic wear strip fitted to the top for the chain to run in / over, but the part that was causing the trouble was a small piece of black plastic that is bonded to the underside of this strip, to avoid "metal to metal" contact with the face of the hydraulic tensioner. The hydraulic tensioner works by engine oil pressure expanding the piston when the engine runs, thus tensioning the chain. However, the piston is not a "closed piston". To ensure lubrication of the faces between the faces of the tensioner and the flat section chain guide, there is a small hole drilled through the face to enable some oil to flow. The small piece of black plastic acts as a "back pressure device" - by pressing against the small oil hole, it causes the piston to expand properly and tension the chain - but in my case it didn't.

Close inspection of the small black plastic square showed that some of it was missing. At first I thought it had "chipped off", but then I realised that it had probably been eroded away by the speed of the oil coming out of the hole. It could have been a faulty part, but it seemed to me that the most likely scenario was that the erosion had been caused by the velocity of the fully synthetic oil that was used for the first 33,000 miles. Of course, no piston back pressure = no piston force = no chain tensioning = noisy timing chain. A new part solved the problem, and the bike runs like a sewing machine all the time, now.

Am I the only person in the world to have come across this? I'd love to know.

The bike now has 62,000 miles on the clock and runs and handles beautifully with progressive springs and heavier oil in the front forks (cures the vagueness at medium speeds) and excellent wear and traction from Michelin Macadam tyres.

Best Regards,

Colin Carpenter
Trowbridge,
England,
UK

K Bike Water/Oil Pump Rebuild

By Jon Diaz
Original Article Dec 1995
Updated May 2003

There is a small weep hole on the leading edge of the oil sump cover on all K bikes. This hole is a drain for the gap between the water and oil seals on a K bike water pump, and when one of the seals fails, its respective liquid will come out of the hole to warn you that total seal failure is imminent.

No big deal. Keep reading. :)

Order the following parts from your dealer: a seal ring for the water side, an oil seal for the oil pump side, a small o-ring for the oil pump gear, and a coolant o-ring for the engine block. Have these parts in hand before you start because dealers generally do not stock them! I would also get a new crush washer for the coolant drain plug.

Here's what these parts should look like:

Photo courtesy of Chuck DeSantis

However......

There has been a recent design change in these parts, and its possible that your dealer cannot get these for you.

Here's what the new parts look like. Notice that the water pump seal has a stamped metal body now, instead of a plastic cover.

Photo courtesy of Clif Lines

A slightly different work procedure is required to install these parts, which can be reviewed elsewhere on the K tech pages. Go here.

Anyway, these instructions assume that you were somehow able to obtain the old parts from Motobins UK or a similar source, and want to fix your old pump.

You must first drain the engine oil and coolant out of the motorcycle. Unplug the oil pressure sending unit and gently remove the protective rubber boot from the connector. If you have a coolant temperature sensor, remove the connector for that as well and remove its boot. Loosen the clamp for the coolant hose and detach the hose from the pump.

Once the coolant is drained, remove all screws holding the front pump cover. The cover is also held in place with silicone sealer, so you may have to pry it off. Be very careful when prying as this part is an aluminum casting and very brittle. Minor pressure should be required to get it off. Things will look a little ugly:

Photo courtesy of the Brian Curry Archives

When the cover is off, you will be staring at the water pump impeller. At this point, loosen the bolt (or nut on earlier ones) holding the impeller and remove it. Don't remove the impeller yet, because it will likely be on very tight and it is easier to remove when the pump assembly is in your hands.

Now remove the screws holding the pump assembly to the engine block and put them aside. The pump may also need a little gentle prying as well, but you can use a little more force because it is a more robust casting. Remove the pump assembly, and pay attention to the oil pressure sending unit wire; specifically how it is routed thru the hole in the pump casting.

Here is what the pump looks like from the oil pump side:

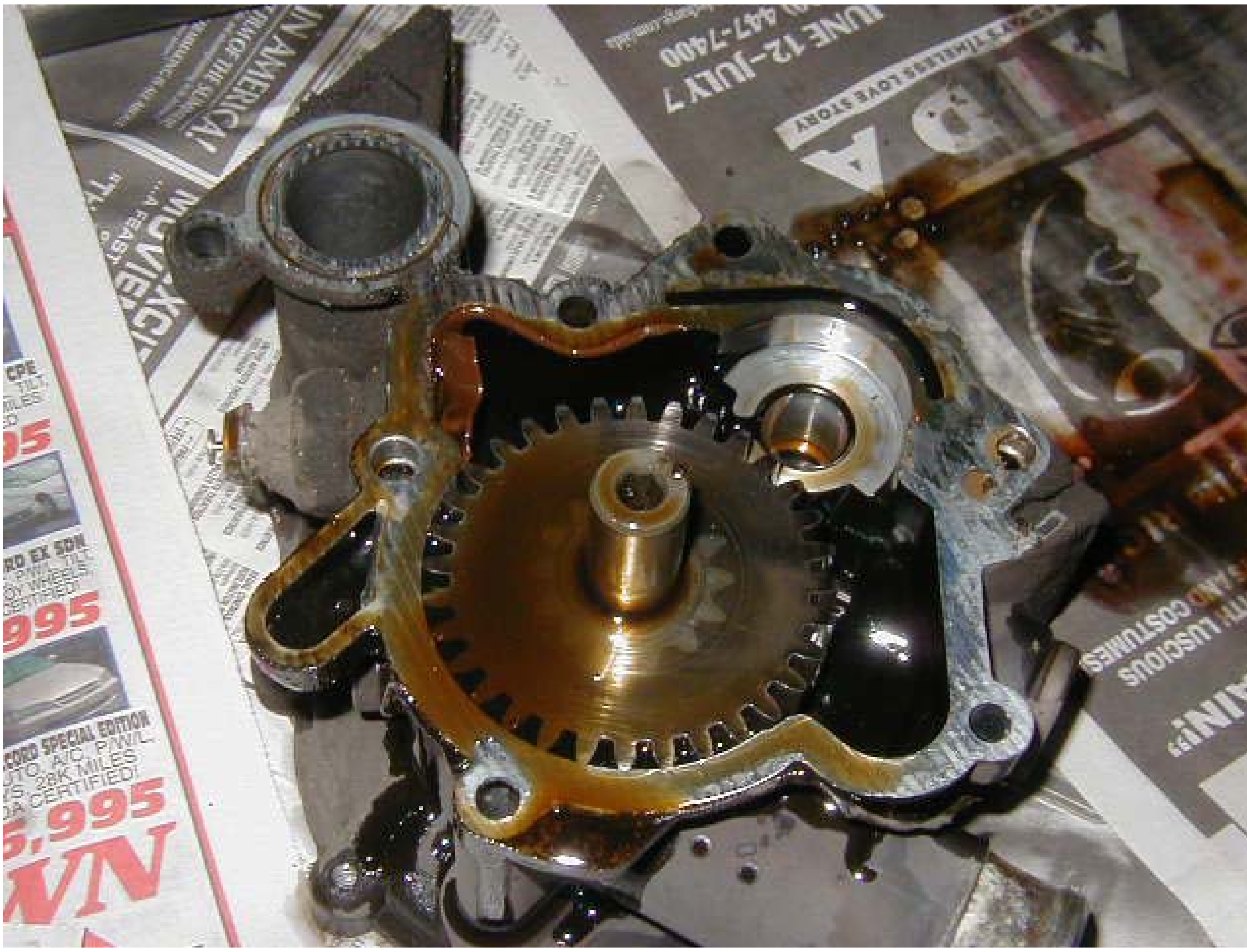


Photo courtesy of the Brian Curry Archives

I would remove the small oil pump gear at this point, and then use an allen wrench in the large oil pump gear to turn the water pump impeller off. I gripped the impeller with a towel, and rotated the oil pump gear in a counterclockwise (loosening) direction until the impeller came off in my hand. Then remove the large oil pump gear on its shaft.

The two seals you are changing are accessible on the water pump side. Clymer says to tap these out from the opposite side with a screwdriver and mallet, and that is what I did. I would recommend that you do not get close to the pump casting at all with your tools though, as gouging the casting will mess up the mounting surface provided for your new seals. I pulled the old ones out with a combination of needle-nose pliers and tapping from the opposite side, which worked ok.

When the seals were out, I fully cleaned the pump housing with degreaser and a toothbrush. Get all the grease off the outside, all the leftover silicone on the sealing surfaces, and all the oil out of the oil pump side. After cleaning with this method, I then cleaned the internals with contact cleaner to ensure that all traces of grease and coolant were gone. I actually waited a few days to continue because I figured more oil would drip out....which it did.

Now install the new seals. Place the housing oil pump side down on a piece of wood because you will be tapping from the water pump side with both of these. The oil seal goes in first, and it should be installed so that the sealing lip points to the water pump side. In other words, the open part of the seal points down toward the oil pump gear. I used a 19 mm socket with extension and a mallet to tap the new seal in. Gently tap the new seal....it will go in without too much force, and make sure that it is seated all the way around. Cocking it slightly would be a bad thing.

Then it is time to install the water pump seal. This seal comes with a plastic cover over the works, and I used a 1 and 1/16" socket plus short extension to tap it in. The rubber side should point down. When the seal is fully seated, the clear plastic cover should break off. Sometimes the tabs attached to plastic cover will also break off during this tapping operation, so make sure you remove all the tabs that were attached to the plastic cover.....there should be eight of them. There will be a ring washer with internal rubber piece that you must keep track of, and make sure it goes on with the wide rubber lip toward the water side of the pump.

Here's what the water pump seal looks like after the plastic has been broken and splayed out, with the remaining solid part setting the depth:

Photo courtesy of the Brian Curry Archives

Before installing the oil pump gear, I would use emery cloth and clean up all the corrosion on the shaft. If the shaft is pitted heavily, it would be worth replacing (about $70 in 1995, now over $175!!!) since it won't seal adequately and you'll end up having to do all this again. My shaft wasn't terribly pitted and cleaned up nicely, so I reused it.

Here is an example of a shaft that was salvaged:

Photo courtesy of Hank Barta

Here is another:

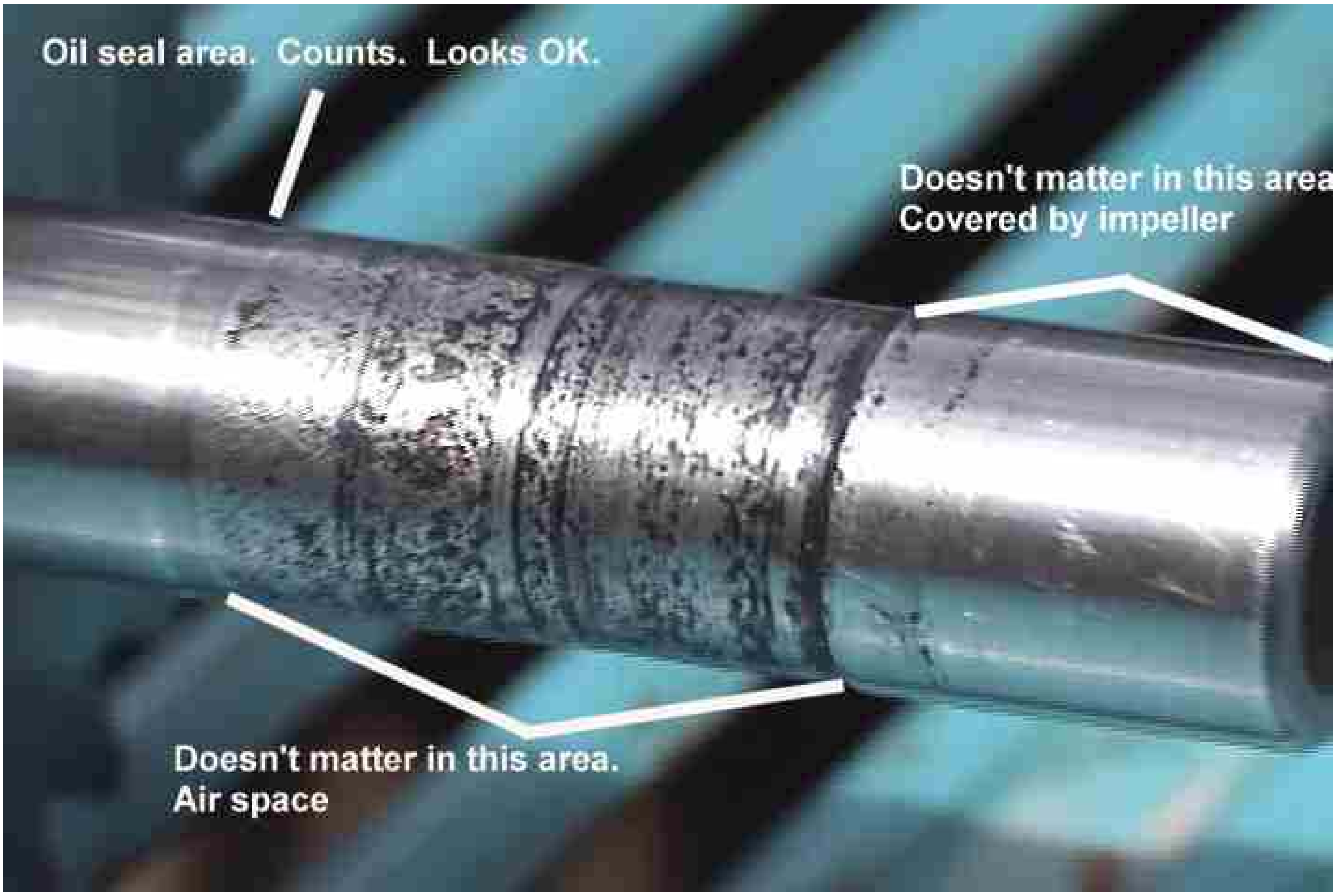


Photo courtesy of the Brian Curry Archives

Gently push the oil pump gear shaft thru the seals, and pay attention to the ring washer on the water seal. It has a very tight fit and the rubber insert will try to knuckle under as you press it on, so pay close attention to that. When the shaft is thru all the seals, push it all the way on so it is fully seated on the oil pump side.

At this point you can install the water pump impeller. I pressed it on by hand, and it was difficult. Resist all temptation to hit this impeller with a hammer to get it installed.....just work it slowly with the heel of your hand and it will slide on.

Once the impeller is seated, clean up the bolt or nut, and after applying threadlocker, torque to the appropriate value. The bolt should be 21-27 ft lbs., but the nut is less and these values are called out in Clymer or Haynes. I torqued this impeller off the bike using an allen wrench in the oil pump gear and a torque wrench on the impeller. Its kind of a three-handed job, but get a helper to hold the assembly and it goes ok.

Install a new o-ring on the little oil pump gear, and you are almost there. Clean all mating surfaces with contact cleaner, apply a film of your favorite silicone sealer to the oil pump surface per the diagrams in Clymer or Haynes, install a new coolant o-ring in the engine block, and slide the pump on. Install all bolts finger tight, and then tighten in a cross pattern to 5-6 ft lbs.

Reinstall the coolant hose, oil pressure sending unit wire, and water temperature wire if you have that, and make sure the coolant drain plug has been reinstalled and torqued with a new washer.

Clean and prep the water pump impeller cover and pump housing, and apply sealant to the cover per the directions in Clymer or Haynes. Carefully install the cover, and install all the screws finger tight. These screws should also be torqued to 5-6 ft.lbs.

I let the bike sit overnight for the silicone sealer to cure, and refilled the oil and coolant the next day. Ride the bike, and probe the little weep hole with a q-tip to be sure that the leak is fixed, and you have performed your first water pump rebuild. :)

Bleeding Motorcycle Brakes

How to bleed motorcycle brakes or a motorcycle hydraulic clutch using the Actron Vacuum Pump Brake Bleeder Kit

Let's face it - motorcycle maintenance and repair tasks like bleeding the brakes or the hydraulic clutch on your motorcycle can be a pain. But it is a very necessary maintenance item to perform -- and it should be done at least once a year.
Brake fluid is hygroscopic (readily taking up and retaining moisture); it attracts water. This water is in the form of moisture in the air. Moisture in your braking system is very dangerous, as water boils faster than brake fluid and can lead to serious problems with the braking performance of your bike. It can also corrode parts of your brake system, including fittings, pistons and the master cylinder. Believe me, I can tell you from experience!

I purchased a 1994 BMW K75 in the winter of 1999. It had only 4,200 miles on it and was a real beauty. But the original owner never rode it much, and other than the initial 600 mile maintenance, no maintenance had been performed on the bike. The brake fluid looked very nasty and brown, so I decided to flush and refill the system. It took about 2 bottles of brake fluid to clear out the system, and then the master cylinder started to leak. I guess the old fluid was so thick, it helped seal the gaskets! I took it apart and found all sorts of corrosion in the bore of the master cylinder, so I had to replace it to the tune of about $175.00. It took about another 2 bottles of brake fluid to flush the system over the next couple of months to get the fluid looking clear and the system working up to par.

Since then, I've gotten into the habit of flushing the brake system, front and rear, twice a year. Once in the fall and once in the spring. I don't put my bikes to bed in the winter; we're fortunate to have occasional days with nice weather where I live, so I try to ride as frequently as I can in the winter. But there can be two or three weeks between rides, and that's when the moisture and corrosion can build up on a bike.

Call me spastic, but I never could get the hang of bleeding brakes by hand. Fill the jar with brake fluid; while holding the jar reach up and squeeze the brake lever (which happens to be on the opposite side of the front brake bleeding screw on my K75); then somehow shut the brake bleed fitting before releasing the brake lever? Or something like that.... Somehow, I just can't see the point of the "speed bleeder brake bleeding valves" sold under various names. You have to put some type of goo on the threads of your bleed fittings, then you still have to use the old "squeeze-release" method.

It just seems to make more sense to me to use a vacuum pump for this job.

There had to be a better way. I heard email posters refer to a "Mity Vac" brake bleeding tool. But a friend of mine gave me some good advice about spending the extra few bucks and buying a "professional" system -- the Actron pump and brake bleeding kit. Don't be put off by the list price shown on the Actron site -- you can buy an identical kit but without the fancy carrying case shown on their website for about $45 at Sears, Pep Boys or other auto parts stores. It pays for itself in probably one use if you can do-it-yourself rather than bring it into the shop. Shops around here are getting in the neighborhood of $60 per hour, so I figured it would pay for itself with the first bleed.

The Actron unit is very well made -- out of metal. But the best thing about it, I've found, is the vacuum pump gauge. It lets you see exactly what's happening as you perform the bleeding, and as long as the gauge shows that you're holding some vacuum in the system, it means air isn't entering in through the bleed fitting.

Using the Actron Kit (See "More Tips" below)

It's very easy to use the Actron system and it makes bleeding brakes a simple job with "no muss or fuss". I'm at a point where I can bleed both the front and rear brakes on my bikes in less than 1/2 hour from setup to cleanup. The way I figure it, the easier it is to do, the less likely you'll be to ignore the maintenance!

The complete kit consists of the hand pump, two hoses and a container to hold the used brake fluid. The container has a screw-on top which is airtight once sealed; the top has two nipples on it, one is for the hose that goes to the pump and the other is for the hose that goes to the bleed fitting. There is also a tube of some type of grease you can use to put around the threads of the bleed fitting after you've loosened it, but after I used up the little tube that's supplied in the kit, I simply use either generic brand petroleum jelly or regular grease in its place.

Before you begin, make sure the master cylinder cover is loose, otherwise you won't be able to overcome the vacuum created by trying to suck the fluid out of a sealed system. Use an old turkey baster to suck out most of the old brake fluid in the master cylinder, and you can use a clean paper towel to wipe out any sediment. Then fill the reservoir up to the top with fresh fluid -- always put the cap back on the brake fluid container as soon as you can. I also set the top back on the master cylinder, just to make sure no dirt or dust find there way in there.

By the way, here's a tip -- I use a couple of pieces of aluminum foil and spread them around the master cylinder and over the gas tank and anywhere else the brake fluid might drip. Brake fluid is supposed to be pretty corrosive stuff on paint jobs, so I always keep a spray bottle of non-ammonia window cleaner (e.g., "Glass Plus" brand) nearby and some paper towels to spray and clean up any brake fluid drips as quickly as possible. I also spread some foil around the brake rotor and around the bleed fitting to prevent the fluid from landing on anything important -- like my tire!

Screw the top on the Actron container, attach the black hose from the pump to the container, and the clear hose from the container to the bike's bleed fitting -- the clear hose is so that you can see the fluid as it comes out and you can tell if there are bubbles in it. You may find that the end of the clear hose will stretch a bit after 2-3 uses, so you may need to trim 10mm or so off the end of the hose with a sharp razor knife. This gives you another section of unstretched hose end, which is harder to get over the bleed nipple, but helps to keep the seal airtight.

Pump the handle of the Actron pump a couple of times to make sure you can draw a vacuum, and let everything set for a few seconds to make sure the vacuum holds. If the vacuum gauge starts to drop, you probably have some air leaking in, so you should check everything to make sure it's sealed. The instructions tell you to put some grease on the threads of the container to help prevent air leaks, but mine seems to work well without it, although I do put plenty of grease around the bleed nipple threads.

Slightly loosen the bleed fitting, and you should see the old fluid start to come out. I keep about 10 pounds of vacuum going (see the photo on the right), which means you'll have to give a few pumps occasionally. Make sure you put some grease around the threads of the fitting to prevent any air leakage. I rest the container on top of an old plastic toolbox, which means this is basically a one-hand operation.

It's important to keep an eye on the brake fluid level in the master cylinder -- if I'm alone, when the level gets low, I screw the bleed fitting back in and go around the bike and pour some fresh fluid in. If I can talk my wife into helping me, she keeps an eye on the fluid level and keeps it refreshed. Also, check the old fluid level in the container that's attached to the Actron pump -- if it gets too full, it will get sucked up into the pump body itself. Although one of the nice things about the Actron pump is that it's all metal and can be taken apart for cleaning. It's a good practice to take the pump body apart and clean it with some water and dishwashing liquid after using it anyway, then dry it before you put it back together.

That's really all there is to it -- keep up the vacuum and you will see the old fluid pour into the container. As long as you keep a vacuum, you know you're sucking fluid down through the system. It takes a few times to get the hang of it; you'll probably find that you only need to crack the bleed nipple very slightly to get a smooth, steady flow of fluid.

You can screw in the bleed fitting at any time and see if there's a about 2/3 of a bottle of fresh brake fluid through the system and figure it's flushed. I've really never had any problems with air leaking back into the system.

Using the Actron pump works great when the system does have air in it, like after you've changed the master cylinder or replaced the brake lines. I'm not sure of the technical reasons, but it seems like when pulling the brake fluid down through the system is better than trying to push it through by hand. The only way that might be better is the professional systems available at some motorcycle dealers that pressurize the system and automatically push the fluid through. This type of system is sometimes used on motorcycles with ABS braking systems.

More Tips: You may find that at first you'll get air bubbles into the bleed hose no matter what you do. It does take practice! It took me several times of bleeding before I could get the hang of it, but now it works great. First thing I learned is not to use the black "L" shaped fitting that Actron supplies for the end of the clear hose. I was never able to get it to create a decent seal.

I then went to the local hardware store and bought some 5/16" OD x 3/16" ID clear tubing. Cut the end off with a sharp razor knife so that it's perpendicular to the hose. It's very hard to get the end of the new hose on to the bleed nipple, but if you warm it up a bit with your breath, it will fit. First thing before you open the bleed screw is to give it some vacuum and make sure nothing's leaking. If it is, then you know the hose isn't on their correctly, but with a tight fit, it should work ok. I also got a very small screw-type hose clamp and clamped the other end of the hose to the little container they give you. I had originally greased the threads on the container also, but later on found that it didn't seem to matter.

Then make sure there's a real good dab of grease all around the threads. Open the bleed screw slightly; *the trick is in learning how to just open the bleed screw enough to get a slow flow of fluid and not to open it too far*. I think at first I was trying to get the fluid out too fast, but it's better to take your time and let it come out slowly.

Like everything in life, it does take some practice to bleed the brakes without air bubbles; the first couple of times I did it I had some problems. Now I can almost always do it first time with no air bubbles at all on any bike I've tried. I will go back and add this to the article.....

NOTE: You can also build a "reverse" brake bleeding rig that works by pressurizing the brake fluid in the master cylinder and pushing it out the bleed nipples - use a Gunson Eezibleed from **Auto Expert Products**; they're only about $30.00.

Front Fluid Quantity and Suspension Response

By Brian Curry
November 1998

My latest K75RT, a 92, had Showa forks. This is the first I had Showa's. The front of the bike was scary under braking. It dove like crazy. I thought I needed new Progressive Springs.

As part of the prep for running it to the West, I drained and refilled the forks. For some reason, I checked the amount of fluid that came out of the first fork, ~360 cc's. Odd number it seemed. The Non-Showa RT's took 280 cc, and the non-sport suspension was supposed to take 330 cc and the drained amount was more than this.

I checked the owners manual. It said 280 and 330 cc's. Hmmm. I checked the manual version date. It was old... and pre Showa... Time to call the dealer.

Lee Kundrat, of Otto's BMW Cycles, told me Showa forks were supposed to take 410 cc's.

OK, I tried that and put 410 cc's of BMW 7.5W oil in each leg.

Then I rode the bike. Even I, the suspension idiot, could tell the difference. :):) It was a night and day difference. The dive was much reduced!! The front end suspension felt much more composed.

Then I thought about it a bit. The new, proper, larger fluid volume, reduces the air volume above it, compared to the way I got the bike. This means that when the fork compresses, the air PRESSURE increases much faster than when the volume is larger. Increasing air pressure acts like a rising rate spring. Effectively, putting more fluid in the fork increased the spring rate a lot when the fork tried to dive. (Some time back, HD had a brake dive reduction scheme, by isolating an air chamber that connected to above the fork oil. It gave a "higher" spring rate, when you were on the brakes and the fork air volume was cut off from the chamber.)

Having the proper amount of fluid in the forks IMO, eliminated the need for a spring transplant and made the CC jaunt much more pleasurable.

So, if you want more "cushiness" and "plushness" although with more dive, put in less fluid. If you want more "control" and "firmness" and "less dive" put in more fluid. Remember there is a limit on how low or high you can go. If you go too low, you can hear the transition from air to fluid as the fork valving compresses. Shock "absorption" will vary a lot depending if there is air or oil going through the restriction orifices. If you go too high, the fork tube pressure will go REAL HIGH. The suspension may appear to be "solid" or "locked". You might be able to blow the fork seals or O-rings out. Either are not be good things. Remember, when you deviate from the BMW factory values, you are on your own. Travel with care.

BWM specified fork oil quantities/capacities have varied over the years. Here is a table of values:

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==========================================================
Fork Oil Quantities/Capacities

Model            Leg      Change       Disassemble
```

K75 Showa	L	410 cc	420 cc
K75 Showa	R	410 cc	420 cc
K75 BMW	L	330 cc	
K75 BMW	R	330 cc	
K75 Sport	L	280 cc	
K75 Sport	R	280 cc	

(Has an "S" stamped on the aluminum plug on top of the leg.)

16V

K1100LT	L	350 cc	400 cc
K1100LT	R	400 cc	400 cc
K1100RS	L	350 cc	400 cc
K1100RS	R	400 cc	400 cc
K1, K100RS	L	380 cc	400 cc
K1, K100RS	R	380 cc	400 cc

8V

K100	L	330 cc
K100	R	330 cc
K100		
RS/T/LT	L	360 cc
RS/T/LT	R	360 cc
(Sport)	L	280 cc
(Sport)	R	280 cc

(Has an "S" stamped on the aluminum plug on top of the leg.)

R1100 Oil Change only if disassembled

	L		450 cc
	R		450 cc
R100R	L	410 cc	420 cc
	R	410 cc	420 cc
R100GS/PD	L	410 cc	470 cc
	R	440 cc	470 cc
>88-R100RT/RS	L	320 cc	
	R	320 cc	
>85-R65/R80	L	300 cc	
	R	300 cc	
>85-R80RT	L	320 cc	
	R	320 cc	
R80GS	L	220 cc	
	R	220 cc	
R80ST	L	190 cc	

```
                 R        190 cc

>84-R65/LS       L        190 cc
                 R        190 cc

>81-R100
R100CS/RT/RS     L        220 cc
                 R        220 cc

>81
R60/7, R75/7, R80/7, R100/7, R100S, R100RS, R100RT
R60/6, R75/6, R90/6, R90S
R50/5, R60/5, R75/5
                 L        265 cc        280 cc
                 R        265 cc        280 cc

R50US, R60US, R69US (1968-1969)
                 L        265 cc        280 cc
                 R        265 cc        280 cc

PRE 1968 Model Twins
                 150-170 cc Both Legs
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There is a Service Instruction 31 026 92 (2547) which is supposed to have additional information.

A ">" indicates that the data is correct for models up to that model year from either start of production, or an earlier date when the value was different.

This data is was correct as of Oct 4, 1993. After that, you are on your own. But it may be some help. Why does the amount vary from the Left to Right leg? Don't know. BMW says it does.

Fork Spring Installation Tips

By: Rob Scott
June 1998

This past Saturday I installed Progressive forks on my '91 K75 and thought that I'd write about a few bits of tech and in turn ask the opinion of the presidents about a discovery that I made in the process.

I have a K75RT, and the instructions on the K-tech web page were very helpful. When I pried off the fork caps, I was dismayed to see powdered rust under them around the edge of the top plug. After depressing the top plugs, I found that the snap rings had both rusted substantially but were not frozen in place by corrosion.

After removal of the fork innards, I inspected the inside of the fork tubes. Both tubes had patchy surface rust in spots down to the bottom of where the two plastic spacers stopped. Before installing the Progressive springs I used a rod and a shop rag in a manner similar to swabbing out a gun, and this removed most of the rust but left a few light patches of more advanced corrosion.

By the way, the four month-old BMW fork oil came out a muddy purple-brown color. Clearly there was some water contamination in both forks, but only a few practically microscopic drops of water were left in the bottom of my drain jar.

So, what could possibly cause such water contamination and rusting? I do ride daily in all weather, so perhaps heavy rain penetrated the works? I don't recall being stupid enough to spray a jet stream of water anywhere on the bike so I don't think that washing could be the cause...

When I cleaned everything up and was about to replace the plastic fork caps, I liberally applied synthetic Teflon bicycle grease to the underside. From my years of bicycling I've learned that anything that you don't want corroded should be coated in lube. It certainly can't hurt in this application.

So, a few tidbits that might just make this an easier story for someone else replacing the springs. First, I used the method supplied by Progressive to determine the correct amount of fork oil for use with the new springs. For the K75RT (pre-92) the BMW recommended amount by volume was 550 cc. Using the spring installation method of measuring oil height in the forks (with springs removed and forks collapsed all the way) I used just a shade over 450 cc to bring the level up to 5.5 inches. So, at least with the K75RT I can now reliably recommend 450 cc for those who install Progressive springs.

The second tip will be useful for anyone trying to do fork spring work without a helper. The real difficulty of getting at the springs is reliably depressing the (lightly pre-loaded?) top plug so that the spring clip can be pried out. I overcame this problem with the help of my trusty Craftsman 4-inch gear puller. This handy little tool can be configured for either two or three "grabbing" fingers. I configured it for two hooks and it connected perfectly with the underside of the upper triple clamp. I hand-tightened the central press bolt to depress the top plug, and I had plenty of room to work on the wire retaining clip.

Yet another tip for your consideration is the method that I used to remove the retaining clip. I have not seen anyone describe their particular methods, so perhaps mine will be food for thought. I first used a small flat-bladed screwdriver applied to one end of the clip and was able to work it down out of the groove with a few light taps of a small hammer. I then inserted a VERY thin knife blade (thank you, Mr. Victorinox) between the fork tube wall and the clip end. Now I used the flat bladed screwdriver again to gently pry the clip end up, allowing it to slide up the knife blade, over the groove and out over the end of the fork tube enough so that it may be grabbed with a needle-nosed pliers. Once I figured this method out on the first fork, it worked reliably and most importantly it was easily repeatable on the second fork.

From: tcora@skylands.ibmwr.org (Tom Coradeschi)
Subject: Re: installing fork springs...help?
Date: 25 Jul 94 10:39:19 CDT (Mon)

Jeff Bacon wrote:
>I finally got my new Progressive fork springs. (Considered the
>LM antidive kit, but have heard it makes things too stiff.)
>
>Unfortunately, they don't come with instructions on how to install
>the bloody things. And the Haynes manual I have starts its
>instructions with "take the fork tubes off the bike"...
>I can probably muddle through the job using it as a guide, but...

Nah. Jack up the front of the bike - a floor jack and a wood block under the front of the engine works fine for this! Take the handlebars off (just remove the 4 bolts and push it back so you can get at the top of the fork tubes). The black plastic caps pop off and you can then get at the plugs in the top of the fork tube. You have to push these down (I use a hex drive, extension and ratchet to rotate the plug while pushing down on the plugs). Then you can pry out the circlip. Rotate the plug some more and it should come right out (you may have to let the front of the bike down a little for this, I think the stock springs have little preload if any, so you want the springs to push the plug out for you).

Reach in and pull out the preload spacer and then the old springs. Install the new springs. Cut the preload spacer down - the sheet which came with the new springs tells you how long to make it and install that. Assembly of the plugs is reverse of disassembly. The Progressive springs have much more preload than the stock springs, so you'll have to coordinate your tools and actions to get the circlip back in. A helper is a Good Thing for this job. While you're at it, renew the fork oil!

tom coradeschi <+> tcora@skylands.ibmwr.org

K1100 cartridge fork notes

By Jon Diaz
March 1997

Chuck DeSantis and I installed a beautiful Ohlins shock and a set of WP fork springs in his K1100LT last Saturday, and encountered some interesting details with the BMW cartridge fork that might interest and help some of you in the future.

DISASSEMBLY:

First off, unlike the earlier K75/K100 fork I am familiar with, the fork cap is threaded. We loosened the pinch bolts on the top triple clamp, and luckily I had a 30 mm socket laying around to unscrew it. It came off without a problem, although it left us facing fork internals I had never really seen before, which is why I am writing this now.

The inner damper rod is positively located to the perforated cartridge shim at the top using split collets. However, once the collets aren't there, the damper rod slides down into the fork, and is nearly impossible to pull back up without removing the fork tube.

Fortunately, we were alerted to this possibility before anything bad happened, and threaded an M4 screw into the top of the damper rod with a string attached to it to hold it up when the collets were removed. The string makes it easy to tie off to a grip or fairing location should you not have a spare hand to keep pressure on it.

After pushing down on the cartridge shim and removing the collets, you should be able to pull the perforated cartridge shim out. Be careful while you pull it past the bolt head which you have threaded into the damper rod, otherwise the string will be severed and the damper rod will slide down into the fork.

Once the shim is out, you are looking at the top of the fork spring, which is retained by an internal spring clip. This took quite a bit of fiddling on our part to remove, mostly because there was little to grip on. Be careful around the threads, and pull the spring out when the spring clip is removed.

REASSEMBLY:

We would recommend filling the the forks to the required oil amounts before reassembling, as it takes forever to fill the forks when the fluid has to drip thru the perforated cartridge shim.

We installed the new fork springs, inserted the spring clip (we used a spark plug wrench to compress the fork springs), and the rest went back together without a problem. Don't forget to tighten the upper triple clamp pinch bolts afterward.

Hopefully this will help anyone looking to install fork springs on their late-model K1100.

Jon Diaz

Notes on the Fluidbloc Steering Damper

By Kari Prager
April 1995

Several people have mentioned the basics on K 75 front ends that relate to stability, i.e. steering bearing adjustment, tire wear (very important), suspension condition, but nobody has mentioned the fluidbloc steering damper which is in the steering head of the K 75 (all models).

The outer portion of the steering damper is locked to the steering head by pointed allen bolts, the inner portion fits around the steering stem, the damping is provided by a viscous grease as a working fluid between the two parts. The damper must be deactivated (bolts removed) when you check the steering bearings or the resistance you feel will not be the bearings, it will be the damper. Be sure to engage the bolts in their same holes on reinstallation.(The bolt lengths are different for different models.)

If you do check your forks and feel no resistance with the damper bolts in place, the bolts may have lost their purchase in the damper, allowing it to turn with the fork,(you can check this by looking through the bolt hole & moving the forks) or fluid may have all leaked out (you might see the remains on the lower triple clamp, or you might not..).

This damper is important for stability, because the K 75 has less weight on the front wheel than the K 100.

Regards, Kari & Tim Johnson

By Rob Lentini

The fluidbloc damper is an internal grease friction device fitted to many K75s and all K75Ss. It should be serviced every time the steering head bearings are removed for cleaning, regreasing, and adjustment.

A special heavy silicone grease is specified. It's not cheap, but you won't find any substitutes that are as heavy a silicone as this.

The damper is a rubber impregnated cylinder that resides over the steering stem between the two tapered roller bearings. Clean and regrease the damper each time the bearings are serviced. The damper is secured by two pointed 'grub' bolts that basically just center the damper and keep it from turning in relation to the frame. The resulting friction when the bars are turned is the 'damping'.

As stated by others, be sure to remove the grub bolts when setting the adjustment of the steering head bearings, otherwise you won't be able to 'feel' the effective preload as you turn the bearing adjuster wheel.

Don't try to do of the above procedure unless you're a competent mechanic. If in doubt, get qualified help or take you bike to the dealer!

Rob Lentini
'87 K75S
Tucson, AZ

By Rob Lentini

The specified grease for the K-bike steering stem damper is (try pronouncing):

"Gleitmittel fur Fluidbloc"

07 589 058 193

Rob Lentini
'87 K75S
Tucson, AZ
K Whiner MC#11

Showa Fork Rebuild

By: Clarence Dold
May 1999

At 68,000 miles, it was time to reseal the Show front forks on my 93 K75S. I called the dealer to order the oil seals (my left fork was leaking badly). He suggested that I might want to change the upper and lower slider bushings as well.

I ordered the oil seals, the two bushings, the fill plug o-ring, and the crush washer for the drain.

After doing the job, I realize that I didn't need the fill or drain seals, as I didn't remove either of those screws. I did want a new dust seal for both sides, and the the o-ring for the top cap, as well as a crush washer for the screw that holds the damper rod.

There are two other bushings that are made of some hard nylon-like material that I didn't replace.

I used two special tools. One was a Jorgenson's bar clamp. The other was a length of thin wall pipe, 1-5/8" I.D, larger than the fork slider, smaller than the fork tube.

I looked at the Clymer's manual, then the ibmwr tech pages.

Start by loosening some bolts while the front tire is still on the ground. Axle pinch bolts, Axle bolt, disk caliper bolts, upper and lower fork bridge. The fork bridge clamps should still be snug, to keep the forks from slipping, but breaking them loose before jacking the wheel off the ground is a good idea.

Remove the belly pan, put a jack under the engine, with a block of wood as a pad, and raise the front wheel off the ground.

After removing the front wheel, loosen the bolts going up into the bottom of each fork, then remove the fender and fork brace. Tie the calipers up against the radiator shroud.

Take off the covers over the handlebars, and the handlebars, sliding the handlebars to the side far enough to get at the top of the fork. Pop the fork top plastic cover off.

Thanks to rob@unixguy.com for his suggestion about using a gear puller to press down on the top cap, to release the spring clip. I'm not as strong as Tom Coradeschi, apparently. I couldn't push down on the cap enough to get the clip out.

I couldn't find my gear puller, but I did find my Jorgenson's bar clamp, usually used for woodworking. In this case, it made a nice clamp, from bottom fork bridge, onto the fork cap. Easy to press down and hold. Then, thanks to Rob for his 'knife' idea, also. Pop the clip downward with a small screwdriver, then put a knife blade in to slide the clip up past the groove and out.

With the top cap out, lift out the top spacer. Remove the fork from the bike, and pour the oil out into a pan, catching the washer and main spring as they come out. I stuck the washer into the spring at the top end where it was supposed to be, as a reminder that the spring's tightly wound coils go toward the top.

As I read the manual, it said to put the fork slider into a vise with soft jaws. I thought about that, and decided to put the fork back into the fork bridge, and tighten the screws a little. Some downward pressure on the fork slider is needed to finish unscrewing the damper rod screw. It might have been possible to do this in a vise, or even hanging the fork upside down to maintain tension against the inside parts, while undoing that bottom bolt.

There is a lower spacer that sits in the bottom of the fork slider, and fits up into the fork tube. This part is now loose inside the fork slider, and must be 'caught' later. The fork should not be allowed to collapse completely now, as this spacer is no longer in alignment with the bottom of the fork tube.

The Clymer's manual didn't cover the Showa front forks. It only covered the BMW-built forks of the earlier K-Series. The Showa parts seem to be simpler.

Pop the dust boot off with a dull blade knife, then remove the clip ring with a screwdriver. Since the bottom screw is now out of the fork, the fork tube no longer tops out against the damper rod spring. The fork obviously slides apart farther, and stops where the lower bushing contacts the upper bushing. Using the fork tube like a slide hammer, yank the fork tube 'briskly' to pull the upper bushing and oil seal out of the fork slider. The lower bushing is at the bottom of the fork tube, and is split. Twist a screwdriver in the split, and pop it off the fork tube.

Clean all the parts, and start reassembly.

Put the damper rod with its spring into the fork tube, and then put the fork tube back into the fork bridge to hold it in position for the next step. Slide an 18" length of coat hanger up through the bolt hole in the bottom of the fork slider, to act as a guide to drop the lower spacer down into place. Then bring the fork slider, with the spacer and coat hanger, up to the bottom of the fork tube, and use the coat hanger to align the damper rod down into place. After removing the coat hanger, the weight of the damper rod is the only force you have holding the damper rod, as you start the screw through the bottom of the fork slider, into the damper rod. Once it is started, you can pull down on the fork slider, increasing the tension against the bolt, to tighten the bolt fully. Some manuals suggest a little sealant on the bottom of the spacer, and on the bolt, to prevent oil seepage.

Take the fork assembly back out of the fork bridge. Putting the top bushing back down into the fork slider would have been difficult, except that I had a chunk of pipe that fit over the fork slider, and inside the fork tube. The I.D. is 1-5/8". I think it is from cyclone fencing, but I'm not sure. It's thinner wall than water pipe. If your pipe is old and dirty, like mine, put the fork top cap into place to prevent debris from falling into the fork tube while banging on the pipe.

Put the washer on top of the bushing, and drive the bushing down. The oil seal is next, on top of the washer. The oil seal has a 'top' and 'bottom'. The 'bottom' is more open, the 'top' has thicker walls. Put the oil seal in place, and use the old seal as a cushion to drive it into place, using the pipe. Put the clip spring on, then the dust boot. Reinsert the fork into the fork bridge, drop in the spring (tight coils up), washer (make sure it falls flat onto the spring), and upper spacer.

The other problem with the non-Showa book is that the oil fill volume is incorrect. . The fork is supposed to have 420cc on a disassembly job.

I measured water into a bottle, and then poured oil into another like bottle to the same level, avoiding having to measure oil with my wife's kitchen tools ;-). With the fork cap still off, the top spacer can be pulled up a ways out of the fork tube, making a nice funnel.

Use the Jorgensons clamp to put the top cap and clip ring back on, and you are done with the forks.

The hardest part of the job was actually getting the grommets back into place in the fender, surrounding the brake lines.

K1100 Steering Bearing Removal

By Garry Campbell
January 2001

What you will need to make, have or find;

1. 1 large steel flat washer 76mm OD X 35mm ID (3" OD X 1 3/8" ID)
2. 2 Flat type "C" clips (one as spare only) 30mm ID (1 3/16")
3. Good wire cutters (for cutting bearing cage)
4. 2 legged adjustable gear puller with a reach of 185mm (7")
5. 1 tube type socket or solid bar with an OD no greater than 27 1/2mm (13/32")
6. 1 tube type socket or strong walled pipe with an I.D of about 22mm (7/8") and a depth of no less than 38mm (1 1/2"). If using pipe you will need something to cap one end.
7. Electrical tape for thread protection while working on lower triple clamp.

Note: Both sockets are only used in conjunction with gear puller so anything that is strong enough and resembles a socket will suffice.

Steps to take presuming you have the triple clamp removed from your machine;

Removal of bearing inner cone from knurled nut:

1. Wash grease from old bearings so you have something clean to work with.
2. Wrap electrical tape around fine thread on shaft to prevent damage.
3. Cut bearing cages away with wire cutters.
4. Take knurled nut in your hot little hand and place the large steel flat washer over bearing proper.
5. Assuming the washer has dropped down far enough, place the "C" clip in front of the washer and behind the lip on the bearing proper.
6. Place the socket or solid bar in the center of the bearing.
7. Using the gear puller with short leg setting, place the center bolt of the puller on the socket or solid bar and the hooks behind the large steel flat washer then begin to apply pressure.

Removal of bearing inner cone from bottom triple clamp:

1. Extend legs on gear puller to enable it to reach from the top of the shaft to the bearing to be removed.
2. Place the large steel flat washer and "C" Clip on bearing proper as done previously.
3. Place the socket or strong walled pipe over the threaded end of the shaft so it rests on the section of shaft where it steps to the larger size.
4. Place the puller over the shaft with center bolt resting on the socket or strong walled pipe and the hooks behind the washer as described before then begin to apply pressure.

Note: For stubborn bearings gentle heat may be required to get them moving but to date I haven't had to resort to that method.

Removal of bearing outer cones from frame:

The bottom one can be easily removed by placing a drift down through the neck until it makes contact with the edge of the cone. Using gentle taps work your way around the cone to ensure it slides out evenly.

On the K1100 the top one is a little more difficult as there is no edge to make contact with the drift, if you take a close look you will see there is a small groove below the bottom of the cone.

In my tool kit I found I had a rod with a small washer welded on one end, by placing the rod up though the bottom, the washer fitted nicely into the groove and I was able to gently tap the cone out, again working my way around to ensure it came out evenly.

A slide hammer with an end small enough to fit into the groove should also do the trick.

The new bearing can be tapped into place on the knurled nut by using a socket or tube the correct size to fit on the inner cone., on the bottom triple clamp you will need a strong walled pipe just large enough to slide over the shaft and make contact with the inner cone of the bearing.

Note: Ensure all tools are clean and free from grit when you start working with the new bearings.

Steering Bearing Removal

By Peter Rihoy
June 2001

Dear Tom,

'just read a couple of articles regarding steering head bearing tension. Mention is made of the difficulty in removing the inner bearing from the lower triple clamp for replacement, the following worked for me.

Select two lengths of studding (threaded bar) about 1/4" diameter, being an inch or so longer than the steering stem,

After cutting or grinding the cage & removing it & the rollers from the lower bearing, grind the ends of the studding so that, when they are placed parallel to the stem and resting on the bearing surfaces they mate (more or less) with the bearing surfaces (an extra pair of hands is useful at this stage). Then Arc or Mig weld the studding to the bearing surface.

Take a piece of 1" x 1/4" flat stock bar and drill it (a little oversize is best) to slide over the studding, so that the centre rests on the threaded end of the steering stem. Then install two nuts on the ends of the studding.

You now have a puller attached directly to the lower bearing.

Tighten both nuts evenly and the bearing will pull off neatly.

If you prepare all parts in advance (so that you are able to assemble and begin pulling immediately after the welding) the residual heat will make the process even easier.

Pete Rihoy
Guernsey, Channel Isles, U.K.

Steering Head Bearing Replacement Tips

By: Ralph Catanese
April 2003

I just replaced the steering head bearings on my K11RS and would like to share a couple of tricks I used:

1. I slid a screwdriver under the upper race, cut a broomstick and put it through the steering head from the bottom and tapped it with a hammer. That's a three handed job, since I only have two, I drilled a hole through the broomstick, pushed it through the steering head, then put the screwdriver through the hole in the broomstick and under the upper race. I couldn't get that upper race to budge, until I heated the steering head with a hair drier. Then it came right out.
2. I cut away the lower bearing retainer and removed the bearings as you described, then used a dremel to cut a slot in the inner bearing cone. Wedged a screwdriver in the slot and tapped it lightly. The bearing cone cracked and slid right off the steering stem.
3. When installing the new bearing, put the steering stem (with triple clamp attached) in the freezer and put the bearings in the oven at 180 degrees F. The bearing will drop right on, but you probably still need a pipe to push the bearing on straight. I found that a drain tube for a kitchen sink fit perfectly. DON'T FORGET TO PUT THE DUST CAP ON BEFORE THE BEARING. You'll never get the bearing back off without damaging it.

K-Bike Headset R&I Tool

By Jim Normandeau
April 1998

I followed the Haynes manual up to the point where you need to remove the races. The manual says you need a special puller, others suggested a custom tool. This is what I found to work on my '85 K100RS:

I bought the following to remove and install the races:
(Note that these are basic nuts and bolts found in any hardware store.)

1 - 5/8" x 8" bolt
2 - 5/8" nuts
2 - 1.75" diameter washer (standard size for above bolt)
2 - 2.5" diameter washer (standard size for 1' bolts)

- Shave two sides of the 1.75" diameter washer just enough to allow it to slide sideways through the bottom race.
- Once inside the tube, turn it so that it rests flat on the bottom race.
- Using the bolt with one of the nuts screwed on to it place it through the washer and then screw on the other bolt to holt it in place on the bolt.
- Now "gently" tap out the race. It worked like a charm for me. You may need to use a bigger hammer and two washers to get out the sticky ones.

Use the two larger washers and bolt to press the new races (one at a time) into place by slowly tightening the bolts with one washer at each end.

Addendum on Headset Bearing Tool

By: Stash Zdanuk
November 2000

I tried to send a note to Jim Normandeau letting him know that I used his Steering Head Bearing Race removal tool and it worked quite well. Unfortunately the e-mail address is no longer valid. I have one suggestion....

After pressing the new races into the tube with the big washers, they'll be flush with the ends of the tube. The top race, when fully seated, is recessed a very small amount below the tube. The lower race is recessed 1/8" or so. Once I got each race flush, I placed one of the old races between the new race and the large washer and tightened little more. This fully seated the race. Make sure the old race is lined up with the new one to avoid damaging the tube when tightening.

Great information on the site. I check it whenever I've got something to do on my '85 K.

Stash Zdanuk
Portland, CT

BMW PART SUBSTITUTES

Other Vehicle/Vendor Parts
That Can Be Substituted For BMW Parts

***Disclaimer!** The comments, opinions and procedures expressed in the "Part Substitutes" page and other IBMWR tech pages are solely the opinion of the author(s) and neither represent the opinion of, are endorsed by, nor have been verified by the Internet BMW Riders. None of the statements or representations presented here have been checked or verified for accuracy. The author(s) may or may not be knowledgeable mechanics. **Use this information at your own risk.** The parts to be substituted and procedures related on this page may not fit, may not work, may not meet manufacturers specifications, and may cause damage to you and your motorcycle. **BMW has recently indicated that use of non-BMW parts may be cause to deny some or all warranty claims.** Again, use at your own risk. Contact the author(s) for any questions or comments.*

> ... and on this subject, words of wisdom from one whose business is to remanufacture motorcycle parts:
>
> "I sadly smile and wonder every time I see owners using 'equivalent' parts to save an inconsequential sum of money. By using manufacturer-specified parts, proper fit, performance and reliability are assured. If you must use 'equivalent' parts, let it be for reasons of necessity rather than cheapness, and be very sure you know how it compares to the approved part."

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have been verified by the Internet BMW Riders. None of the statements or representations presented here have been checked or verified for accuracy. The author(s) may or may not be knowledgeable mechanics. ***Use this information at your own risk.*** *The parts to be substituted and procedures related on this page may not fit, may not work, may not meet manufacturers specifications, and may cause damage to you and your motorcycle.* ***BMW has recently indicated that use of non-BMW parts may be cause to deny some or all warranty claims.*** *Again, use at your own risk. Contact the author(s) for any questions or comments.*

General (or unspecified model) BMW Parts

John Deere accessory plugs for BMW accessory plugs

Date: Wed, 18 Feb 1998 10:16:58 -0400 (EDT)
From: Steve Welsh <WELSH_S@dep.state.fl.us>

Accessory plugs for the "new" K's & R's:

> the male plug is John Deere #RE11344 $7.3
> the female socket is JD #AL25073 $3.8

Editor's note: These same plugs also fit older (airhead) R bikes, so this item is filed under "general BMW".

Black Panther Predator battery for BMW battery

Date: Wed, 05 Nov 1997 13:33:38 -0800
From: Max C. McHatton <bmwmax@cdsnet.net>

The model number of the Predator battery that fits BMWs is BP600MJ. They are available for $180 from Hansens BMW: (541) 535-3342, www.hansensmc.com . Hansens is constructing a web-page with detailed information, including performance comparisons of batteries and other special products. The Predator batteries are totaly sealed, and are mailable. Black Panther also has a web site for additional information about the Predator battery at www.blackpanther.com/index.html . After I replaced my BMW battery with the Predator, I rode it for about 30 minutes, garaged it (un heated) for about a week and then started it and shut it down five times in succession on a cold morning, without any ABS faults. I'm impressed. One other point of intrest. The Predator accepts over 50 amps of charging current. Try that on a conventional motorcycle battery and you will have a nasty mess and a ruined battery.

Honda Moly Paste for BMW spline lube

Date: Fri, 22 Jan 1999 23:00:44 -0500
From: Mark Domlovil <mark.domlovil@wmich.edu>

R. J. Godlonton eh'ed:

> I understand the recomended lube for the splines is "Honda Moly 60 Paste" eh. Trouble is no one up here has ever heard of the stuff. Can some one supply me with a Honda part number eh?

The part # appearing under the bar code is:

```
08734-0001.
Distributed by: American Honda Motor Co., Inc.
Torrance, CA 90501
Made in USA
H/C 2963866
```

I am not all that familiar with the Honda part system, but one of those two #'s should get you what you need. I paid (uh-oh...) $8.95 US last year for a 3 oz mini cardboard tube of this stuff. I have done three complete clutch/driveline lubes with this and some misc. applications on other spots and the contents barely look used. This tube may last longer than the K's.

Hella accessory plug for BMW/car accessory plug

Date: Fri, 5 Feb 1999 22:55:47 -0700
From: R.F. Graver <bmwnut@ionet.net>

I have bought several "Hella" plugs from my local dealer in Phoenix. The ones I buy are convertible plugs, that is, they can be used in the BMW or the automotive sockets. There is a circular plastic part on the insertion end which is removable. When removed, it works in the BMW socket, and when the plastic part is installed, it works in the regular automotive socket. I don't recall the exact price, but they were approximately $10 apiece. A screw holds the halves together for easy disassembly. There are also screw attachments internally for the wires, for those 'solderless' people (on mine anyway). The Hella part number on the box is 8JA 002 252-102 and my dealers ID number is FLA38687135.

> *Editor's Note: When asked about this, a BMW dealer parts manager said the "FLA" number is a Flanders company stock number, not a "dealer's id".*
>
> *Also note, the thickness of the plug body is designed to fit older car sockets which may be much smaller than those in current American vehicles. The plug body measures 15/16 inch diameter including the brass (negative) side contact.*

TOP: Hella plug with end removed to fit BMW socket

BOTTOM: Hella plug with end attached to fit car socket

Westco sealed maintenance-free battery for BMW R or K battery

Date: Sat, 20 Feb 1999
From: Sam Lepore <lepore@dnai.com>

Here are the model numbers and contact information for the Westco Battery SEALED, MAINTENANCE-FREE replacements for BMW batteries.

Shipping & handling included. In Continental USA only 800-214-8040
For orders outside Continental United States, call (714) 938-5080
http://www.westcobattery.com/motorcyc.htm
email: westco@earthlink.net

MODEL	Volt	AH	CCA	Dimensions	OEM REF.	PRICE
12V28AP	12	28	400	6.9H x 6.5L x 4.9W	Y60-NI24A-A/B	$99.95
12V17	12	18	250	6.5H x 7.0L x 3.0W	YB18L-A Y50-N18L	$89.95

Select the 28 or 18 amp hour model based on the OEM specification in your owner's manual.

The 12V28 is suitable for all R and K models which have ABS and require 12.5 volts for ABS initialization. The standing voltage of the Westco battery is 13.6 to 13.8 volts.

KD crimp tool and Oetiker hose clamps for BMW hose clamps

Date: Thu, 18 Mar 1999 12:50:15
From: Brian Curry <bmwbrian@voicenet.com>

BMW and others use a crimp type clamp on various hoses and connections. Some of the typical applications that come to my mind are, the K bike air box to throttle bodies, the reservoir to brake master cylinder hose for the rear master cylinders, the early K bike coolant tank level sighting tubing. R11s have them on the fuel supply hoses. They are used in a number of areas, on BMW motorcycles and other vehicles. The clamps are designed as a one shot application. (Yeah, they probably can be reused but it would be a PITA.) Some would say use a screw type hose clamp. But... in some areas, the only thing that will fit, is the OEM, one shot crimp type clamp. And crimping them is not the easiest thing in the world.

However, Mark Rose, <MRose@PerrierGroup.com>, found this information:

> ==
> I was able to perform some research and came up with the following:
>
> - The dimpled-ear clamps are in fact the Oetiker type (I looked at of the clamps and it has Oetiker stamped on it!)
>
> - KD makes a plier (Part 3374 - $22.00 at NAPA) specifically for Oetiker clamps.

- Pliers for CV boots (GM-type) can also be used provided the anvil is deactivated (requires the removal of the cam):

KD (Part 424 - $21.00 at NAPA)
Snap-on (Part YA3080 - $??)
Lisle (Part ?? - $??)

- You can also buy the BMW tool (Part 88 88 6 131 500 - $41.00), which a little pricey and is currently on backorder for 8 weeks!
===

I have seen the KD tool, Doug the mobil rally mechanic uses it. Good enough for me.

Corbin, Meyer, Russell, and Sargent seats for BMW seats

Date: Wed, 21 Jul 1999 16:31:15
From: Don Eilenberger <deilenberger@verizon.net>

This thread "Corbin Support Sucks" and "Corbin Seats Suck" is regularly scheduled for about a 2 month interval. It pops up more frequently whenever (1) anyone tries for Corbin customer support (2) the Corbin truck shows up somewhere.. There will always be a few voices in the uproar saying how great Corbin seats/support are - just to balance out the mass of people saying it sucks.

This apparently has NO effect on Corbin at all - people have copied ALL the messages and mailed them directly to Mike Corbin - who feels as long as he's selling 10,000,000,000,000 seats a year he must be doing something right. (And EACH and EVERY ONE of those seats is custom made for the bike it's on and is NOT RETURNABLE!)..

The results of the discussion usually are:
===
Corbin sucks (except for a few people who really didn't mind the stock seat anyway).

Sargent is OK - sometimes needs a tweak or adjustment, but they're friendly people who TRY to help.

Meyer is OK - he makes a nice product and if a friendly guy.

Russell is GREAT - only know of 1 person who wasn't happy with his seat from Russell - and got a full refund (he does that 'ya know!)

Your local convertible top/car upholstery shop may or may not be able to modify your stock seat to something you can sit on, at a lot less $$$ than above choices..
===

So.. based on the above - you have one vendor who if you're in your right mind you won't go near, and a bunch of other ones who actually work for your business.. and one mebbe/mebbe-not local one..

I've done my part to impress Mike Corbin - have two bikes and two Russell seats..

Editor's note: While many have expressed opnions on one or two of the vendors, few have experience with all four.

David Fishman <fish@ihot.com> adds:

So there you have it...from a guy who has tried just about all available aftermarket seats for the R11RT. Russell is by far the best and most comfortable (okay...so it took me way too long to come to that conclusion, sue me ;).

If you are interested in my pros/cons of Corbin, Sargent, Mayer, and Russell, feel free to shoot me a note. For others thinking about buying a seat, save the idiot taxes and go straight to Russell.

Editor's note: See also the product review of all four seats, by Richard Bernecker

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Forking By Frank fork tubes for BMW forks

Date: Fri, 10 Dec 1999 09:14:52 -0800
From: conary <fercon@reno.rmci.net>

Forking By Frank   http://www.quikpage.com/F/frankmain/

After finding some internal damage in my bike's fork tubes, I decided (withthe help of the list) that the safest bet was replacing them.

Instead of using BMW tubes ($460+/ pair new or $200+ /pair of unknown quality used), I got a pair from Forking by Frank ($191/pair delivered).

These tubes are guaranteed to be indentical to stock. They are almost. The lower portion that fits into the slider isn't slightly tapered at the end as the stock tubes are. This made insertion past the fork seal a bit more difficult, but I haven't noticed any difference in performance over stock.

My understanding is that they can supply tubes for nearly any BMW.

Scott Conary . 1991 K75s . Reno, Nevada

Airheads/IBMWR member 10% discount Panasonic sealed maintenance-free battery for BMW R or K battery (2)

Editor's Note: This information is valid for both Airheads and IBMWR members. In a separate email dated March 13, 2000, Roy said:

> Since I can't access the IBMWR site, will someone please pass along a copy of this E-mail and let them know that they also qualify for the discount, but must identify themselves as an IBMWR member, and I will have their account information shortly.

Date: Wed, 22 Mar 2000 12:26:50 -0800
From: Roy Truelsen <royster@worldnet.att.net>

Heads,

The following is a letter I received from PPS's Norm Premo, stating delivery, cost and warranty issues.

As discussed, Panasonic makes the battery for Westco that sells for $99 (incl. shipping). Airheads can buy from PPS the same battery for $58.50 (plus shipping). Other batteries, i.e. car phone, camcoder etc. also receive the 10% discount.

I have no affiliation with PPS. As info only.

Ride safe.

Roy Truelsen ABC#4363 1977 BMWR100S 1976 R90 Mad Max
Portland, OR royster@att.net (503) 626-9095 (503) 310-5270 (Cell)

From: Sales@gotbatteries <sales@gotbatteries.com>
To: Roy Truelsen <royster@att.net>
Subject: SLA Battery Discount to the BMW Air Heads Organization
Date: Wednesday, March 22, 2000 9:59 AM

Mr. Truelsen,

Thank you for the opportunity to provide batteries to your organization. Portable Power Systems, Inc. has been in the battery business for 8 years. We specialize in batteries for the medical industry and have established procedures for quality and service in the products we carry. Our entire company is based on the national sales market and has extensive experience in packaging for interstate delivery.

Portable Power Systems, Inc. present volume of the Panasonic LC-X1228AP exceeds 100 units per month. We have the flexibility to increase these volumes with relatively short notice to account for your needs. We typically have 100 or more of this battery type in stock at any given time. We also stock the LC-X1220AP (12 volt 20 Ah) battery. This battery is the same height and width but has a shallower depth.

We would be happy to waive the minimum requirement of 3 batteries to obtain the 10% discount on all Sealed Lead Acid batteries. Presently our e-commerce package doesn't allow a mechanism for deducting the discount when 'checking out', so the adjustment will be taken when we process the order. Another limitation is the freight calculation. Our policy is to not charge handling and bill actual freight cost. When ordering online, the amount calculated for freight on the site may be greater than the actual cost. After the order is processed, we send a confirmation e-mail with the UPS tracking number and actual cost charged to the credit card (battery plus freight). This confirmation (along with the invoice/packing slip enclosed with the battery) should serve as a receipt for the order. Telephone orders will be given the discount and actual freight cost immediately given to the customer. For telephone orders, the shipping/packing list enclosed with the battery will serve as their receipt.

Orders received before 3:00 MST are shipped that day. We ship via UPS ground from Colorado to the continental US. Most customers can expect delivery in 2-3 days (up to 6 days for the extreme Northeast). Since we provide a tracking number with online orders, the customer can track that package online.

All of our Panasonic and Power-sonic batteries carry a 18+12 month warranty. Hawker batteries. carry a 12+12 month warranty. During the first 18 months (12 months for

Hawker) of the warranty period, Portable Power Systems, Inc. will replace any defective battery free of charge. We pay ground freight for the replacement and the customer is responsible for return freight of the defective battery. During the remaining 12 months, the customer pays a prorated price to the replacement cost of the battery plus any freight charges; in this case the defective battery can be scrapped locally.

Until we have a better way of handling your discount. Please have your members state that they are a member of the BMW Air Heads Organization in the comments section of the site. That way we will know to apply the discount when processing the order. When calling in, just mention it to one of our customer service reps.

Again, we thank you for the opportunity to provide you with quality Panasonic products. If you have any questions or need clarification please let me know and I will provide a prompt answer.

Norm Premo
President,
Portable Power Systems , Inc.
E-mail: norm@gotbatteries.com
Voice: 800-551-5645
Fax: 303-460-7306

Airhead Parts (R bikes to 1995)

Borg-Warner regulator for Airhead regulator

Date: Sun, 19 Oct 1997 19:50:19 -0400 (EDT)
From: Al Peirson <ALFXR@aol.com>

The later model airhead twins are equipped with a higher output voltage regulator, which can be retrofitted to all models back to 1970, and costs $100 from your friendly BMW dealer.

I located a regulator at my local Pep Boys Auto Store, which can probably be obtained or ordered at any automotive parts house, which is a bolt right up, plug right in, replacement. The cost is $30. It is a Borg-Warner R-588 alternator regulator. It is electronic, and will fit all airhead twins 1970 to 1995.

Neihoff regulator for Airhead regulator (2)

Date: Thu, 10 Jun 1999 10:04:42 -0400
From: Howard Etkind <howard.etkind@ohio.doe.gov>

Other direct fit replacements exist for the Airhead regulator...

A Neihoff WA 709 fits as well and both generic Bosch and Echlin parts. A decent auto parts counter person can cross reference against either the Borg-Warner R-588 or the Neihoff WA 709 numbers

Differences between stock regulator and Neihoff WA 709:

1. Chrome, not black and orange
2. Pigtail and external connector instead of plug in on regulator body
3. Mounted vertically and not L-shaped
4. Universally available and not only at BWM dealerships
5. $36.16 and not the $140 for the BMW electronic regulator
6. Electronic and not mechanical

Change out time was 15 minutes including tank and right saddle bag removal. Mechanically connected by two phillip head screws and had to remove one other module to gain access to the screw next to frame.

Fit was perfect, both mechanically connections and electrical connections. Bike is now charging 500 rpm lower than before. No more voltmeter cycling and charger HIGHER at highway speeds.

AutoZone regulator for Airhead regulator (3)

Date: Mon, 11 Sep 2000 03:28:00 -0700
From: Lee A. Dickinson <r100rt@home.com>

AutoZone has an equivalent to the Borg-Warner R588 that is made in Mexico and costs $14.95. I have been running one without incident for several years. For $28 you could buy two and carry a spare. The best way not to need a spare part is to carry it with you.

VW Bosch ignition coil for R90 ignition coil

Date: Sun, 26 Oct 1997 23:45:07 -0800
From: Max C. McHatton <bmwmax@cdsnet.net>

The only one I know of is the ignition coils. I put two Bosch Blue high performance 6volt ignition coils on my R90, and noted improved starting, an increase in power and decrease in pinging.

NAPA (BMW 2002) regulator, and VW oil pressure sender for Airhead oil pressure

Date: Sun, 16 Nov 1997 02:52:38 -0500
From: Don Eilenberger <deilenberger@verizon.net>

Dunno if you caught it - but I did post a long time ago the replacement (NAPA auto parts) for the airhead voltage regulator.. don't have the number handy (it's out in the garage SOMEWHERE..).. but it's one off a mid 70's BMW 2002.. Direct plug-in replacement and provides a tad higher voltage to the battery.. cost about $30 or so.

If you don't have it yell and I'll rummage through the garage.

Also - airhead oil pressure senders - VW bug.. same sender. Not a real bargain since they cost about the same from a dealer (~$7) but handy to know if you need one when a dealer isn't open.. any autoparts place has 'em.

Stromberg diaphrams for Bing carburetors

Date: Wed, 26 Nov 1997 21:03:15 -0800
From: Mort Harries <Mort.Harries@worldnet.att.net>

Yeah I guess I was a bit vague, so here's more specifics...

1. The article was in Aug 97 issue of the British mag "Classic Bike". It was a sidebar to an article on restoring a R90S. (lots of other interesting stuff in the article too)

2. The article said the Stromberg CD150 diaphragm fits a 32mm Bing, and a CD175 fits a 40mm Bing. (I have a R80/7 and the CD150 fit my bike's carbs)

3. The box the diaphragms came in had a label for "Carbu Corp. Fairlawn NJ 07410" but no address. It also read "DIAPHRAGMS FOR ZENITH STROMBERG CARBURETORS ZS-001"

4. You have to find a good auto parts store. I called 5 or 6 before I found one that knew what I was talking about, and they just happened to have some in the back gathering dust!

Editor's note: In another email, Mort added ...

I think it would be helpful and explain why to use this non BMW part:

The whole REASON for finding and using Stromberg diaphragms is that on certain R bikes (the R80/7 is one), the BMW dealer will not sell you the diaphragms alone, but will tell you that you have to buy the whole slide assembly with diaphragm attached. This is on carbs where the diaphragm is attached to the slide by a pressed-on nylon ring.

However this ring can be pried off fairly easily with a screwdriver and your fingers. Just be careful not to scratch the slide. The Stromberg diaphragm will then fit on precisely, and the nylon ring can be pressed back into place.

The slide/diaphragm assembly will cost you $40+ at the dealer. The Stromberg diaphragm will cost about $5 at a good auto parts store.

Sears maintenance free battery for Airhead battery

Date: Mon, 1 Dec 1997 09:18:03 -0800
From: George Malina <GKMalina@aol.com>

My '76 R90/6 required a jump start twice Thanksgiving Day - To get it started first thing in the AM at home, then after sitting for 2 hours away from home : (I figured the Yuasa was worn out and needed replacing. I have had the bike for 11 months and have no idea how old it is and I do use a BMW trickle charger on it.

Not having easy access right away to a "genuine" Yuasa or BMW battery, I found myself browsing the lawn tractor battery section of Sears Hardware. (Someone on this list mentioned these as possible replacements - sorry I don't recall who) I found a maintenance-free 325 CCA, Gold Lawn Tractor battery that looked like it would fit. Cost was 49.95.

Installation was relatively staright forward. It did require the removal of both sides of the air filter housing, which on my bike requires raising the main tank about 1 inch as well as removing one of the auxilliary fuel cells. Removed Yuasa, installed Sears. Put it all back together, put on charger four 4 hours. Seems to work well. My voltmeter now reads just over 13v while it was right at 12v or less at idle with the Yuasa.

I like the prospect of a maintenance-free battery. Is there something I am missing or is this yet another alternative to the OEM BMW battery?

Editor's Note: George was asked for more detail in indentifying the battery. He responded:

Date: Sat, 2 Jan 1999 07:30:38 EST
From: George Malina <GKMalina@aol.com>

Sears Gold Garden and Tractor 325cca battery, Group U1R. It also has the marking 96145. When I bought the battery, I went by dimensions and the terminal positions. From my days as a diesel owner, I have always figured get the most cca's for a battery that will fit. BTW, PO had already split the battery case but the installed battery was OEM. The Sears battery was to big to install from the top so I did it from the front after removing the air cleaner housing.

Hope that helps!

Bosch Voltage Regulator and Oil Pressure light switch for Airheads

Date: Wed, 4 Mar 1998 16:57:06 -0500 (EST)
From: David L. Makin <makind@igs.net>

And here's some R-bike from me:

Voltage Regulator, fits all airhead R: Bosch (Australia) RE57

Oil Pressure light switch, up to /7 at least: Bosch 0344101040

MTC Batteries for /2 Batteries

Date: Thu, 12 Mar 1998 00:53:15 -0800
From: Jack <jackson@gamma.rip.georgetown.edu>

Theres been some discussion about rebuilding /2 batteries. I just wanted to follow up on a post I sent a couple of weeks ago for /2 batteries. I found a company in California that makes 6 and 12 volt batteries. these batteries are made of hard rubber cases with exactly the right dimensions The only difference I can make out from the original is that the cases arent smooth like the original batteries, but have three narrow decorative ridges on teh top and bottom. they just look great though and come with their own cover which is a very close copy to the original. I was also told by the battery shop that put the acid in it, that it was a NiCd instead of lead and that it was a better battery (Im dont know anything about. Anyway, it very few times in life your totally satisfied with something you mail order and this was definitely one of them for me. One of the best parts is the price $38.95 +$ 6.95 S&H. the company is MTC and the phone number is 310 538-1620. Once again (standard disclaimer) I have no affiliation with this company and benefit in no way from anyone purchasing one of these batteries. Hey as long as im on the topic of /2's I saw an advertisement for whispertone mufflers by MAC exhaust systems that are chrome and purported fit /2's , saw the ad in Dennis Kirk motorcycle parts catalog for $186.99. I think this is the best price ive seen for mufflers for this bike, anyone find anything better? has anyone used these mufflers? Do they make headers too?

Honneywell sensor for R100 Hall Effect sensor

Date: Wednesday, March 25, 1998 4:48 PM
From: Steven van Twuyver <twuwver1@flash.net>

The R100 Hall effect sensor for the ignition cannister is available from Newark Electronics as part #96F1986 for around $11.48. It is Honeywell part #2AV54.

FRAM Oil Filters for 1970-On Air Cooled Twins

Date: Tue, 01 Sep 1998 14:05:02 -0600
From: Jay Martin <martinj@mscd.edu>

All 1970 and later BMW motorcycles with horizontally-opposed, air cooled engines use one of three oil filters.

Bikes without factory oil coolers use either BMW filter

> 11 42 1 337 572 (unhinged) or
> 11 42 1 337 570 (hinged).

These filters have the same overall dimensions and are interchangeable; the one is hinged only to provide ease in changing. The FRAM filter substitutes are CH 6061 (unhinged) and CH 6060 (hinged).

Bikes delivered with a factory oil cooler use BMW filter

> 11 42 1 337 575 (hinged).

The FRAM filter substitute is CH 6062 (hinged).

Notes -- The above mentioned FRAM oil filters are available in many automotive supply stores -- sometimes special order -- or from motorcycle accessory vendors.

Some riders have experienced their unhinged filters collapsing, regardless of brand. The hinged equivalent is stronger and therefore less prone to collapse. However, a collapsed oil filter may be indicative of a more serious problem that warrants investigation.

Wells Mfg. (VW) Oil Pressure switch for Airheads

Date: Wed, 20 Jan 1999 02:55:55 -0500
From: Dan Toth <dtoth@gconn.net>

Oil Pressure Sending Switch for most BMW "R" bikes.....

Wells Mfg. Corp. PS 102 Oil Pressure Switch is exact replacement for BMW switch and can be purchased from most auto parts stores as Volkswagon Beetle Oil Pressure Switch....

Cost me $2.98 + tx = $3.07

NAPA Oil Filters for Airheads

Date: Fri, 24 Sep 1999 14:29:52 -0400
From: Greg Lindstrom <lindstromg@state.mi.us>

I have for many years bought the oil filters for my BMW bikes at NAPA. I own a R60/5 a R100RS and a R100GSPD. The filters come in a NAPA box with their part # but the filters inside have always been genuine BMW filters. The non hinged ones are between 3.50 and 4 dollars and the hinged are 4.50 to 5 dollars. They usually come with all the gaskets and O rings which I presume are non BMW. Hope this is useful info.

VW Voltage Regulator, Starter Solenoid, Front Brake Switch for R100/7

Date: Thu, 16 Mar 2000 18:15:01 -0500
From: Andrew Clark <aclark@niagara.com>

I'm also a dedicated V.W. gear head and I've noticed some part similarities. please place these in the r-bike parts substitute section.

PART SUBSTITUTES - 100/7

1. VOLTAGE REGULATOR - IDENTICAL to that found on all V.W. type 2 (vans, transporters, westies, etc.) 1968 to 1979.
2. STARTER SOLENOID - IDENTICAL to that found on ALL 12 volt AIR COOLED V.W.'s 1968 to 1983.
3. FRONT BRAKE SWITCH - IDENTICAL to the two prong brake switch used on ALL 12 volt AIR COOLED and early WATER COOLED V.W.'s. Three prong switches can also be used, just find the two prongs WITHOUT CONTINUITY to connect the two wires to.

F650 Parts

Yamaha Oil Temperature Gauge/Dipstick for F650 Dipstick

Date: Sat, 19 Dec 1998 23:38:21 EST
From: Joe Hlavaty <ROOKERY7@aol.com>

I have found that the aftermarket oil temperature gauge/dipstick for Yamaha SR/XT 500s fits the F-650 perfectly and the dipstick mark is even correct. The part looks factory. I bought my oil temp gauge in Germany, but there is a report on The Chain Gang F-650 page that the part is available at Thumperstuff.com.

K Parts

VW clutch plate for K clutch

Date: Mon, 27 Oct 1997 09:28:42 -0500
From: Mark S. Hamlin <mham001@ibm.net>

I once made a living buying/selling VW's in my driveway also. When the set screw fell out of my gear shift lever on my K bike setting off a series of events that led to a complete tear down I noticed that the clutch plate ($100+) is nearly identical to a 40 horse VW. I think the 180 mm. $20. Made by Sachs, Brazil.

The one difference was the pad thickness. Would have required riveting. I decided I didn't need a new one anyway.

Sealed Yuasa battery for K battery

Date: Sat, 8 Nov 1997 21:54:06 -0500
From: Anton Largiader <anton@largiader.com>

The Yuasa YTX20L-BS is a positive-right 18AH 270CCA permanently sealed battery. Yuasa sells them to H-D, Kawasaki, and even export some to Japan. You should be able to find one at a Yuasa dealer (may have to order) but certainly a HD or Kawasaki watercraft dealer would have one. There is also a positive-left version called the YTX20-BS, which will be a H-D retrofit for some older models when the rest of the kit is ready. If you get one from HD it will be filled with acid, but anywhere else and you'll have to fill it yourself (special bottle provided - it's fun to do).

The base of the large Mareg battery is 122mm x 177mm. The base of the YTX20 is about 83mm x 170mm. So you need to create a spacer which makes the bottom of the YTX20 fill the same space as the large Mareg (it is too wide to fit into the step where the small Mareg goes).

While you could shim it with just about anything, I took a block of 1/2" PVC and trimmed it to the size of the large Mareg. I then milled a recess into it the size of the YTX20. To suit the K tie-downs, the YTX20 must be lifted 11mm, so I left the remaining material in the milled recess at that thickness. I centered the recess laterally, and positioned it so the front of the battery was 13mm from the front of the material. This way the tie-down was clamped onto the vent strip of the battery and not the sealing strip. On my low-seat K the cables are pretty close to the fuel computer, since the connectors now have to attach to the front of the terminal, instead of the side as they do on the Mareg. The negative cable end actually sticks between the ribs on the bottom of the computer tray.

I've had no issues with it performance-wise. Once or twice it ALMOST didn't start when it was about 100F, but that's what happens when 20W50 gets cold.

I have no idea what the price should be, but probably similar to the Mareg. And be aware that this battery may not fit bikes which do not accept the large Mareg! If there is only enough width for the small Mareg (and not a mm more) then you're out of luck, as this one is about 10mm wider.

When I get more accurate dimensions I'll put this on my web page with a link from IBMWR.

Yamaha/Kawasaki shims for 2-valve K shims

Date: Tue, 18 Nov 1997 11:04:23 -0700 (MST)
From: Tony Black <TBLACK@cc.colorado.edu>

One item did come up I want to let owners know about. If you need a shim for your 2 valve K and you don't have a dealer close by, shims from some models of Yamahas and Kawasakis will fit in the Ks. If you have one of these dealers closer I'd use them. I have many times on my bikes and others. Ciao Tony

---

NAPA (Mustang) fuel pump for K11 fuel pump

Date: Wed, 19 Nov 1997 10:08:30 -0500 (EST)
From: BillZ <BilZ@longride.net>

Mine died a sudden death somewhere around 70k (93 K11rs, not that that should make a difference) and I am now the proud owner of a NAPA pump for a 4 cyl Mustang, $80 and doing fine.

Date: Fri, 20 Feb 1998 21:31:47 EST
From: BilZ@longride.net

If you want to add to the fuel pump reference of mine, the NAPA part # is P74095 for the pump I installed. The NAPA pump now has over 30k on it with no problems.

NGK spark plugs for K100 spark plugs

Date: Sat, 22 Nov 1997 18:09:53 -0600 (CST)
From: Geoff Adams <tbc@dfw.net>

A couple of weeks ago I was wondering why I was paying around $5.00 each for Bosch spark plugs every 10,000 miles and my Honda Civic with 96k on it still had its ORIGINAL plugs in it (running perfectly, I might add).

Anyway, I got on the phone and called a few auto parts houses and inquired about a crossover for the Bosch X5DC in my '85 K100RS. They all gave the same NGK number and one of them had them in stock. So for $1.17 each I bought a set of NGK 7912 (formerly D7EA). I've put about 3k on them including the run to Savannah III, so I decided to pull a couple and see how they looked. They look exactly like the Bosch's always look, which is to say, perfect. The run to Savannah was over 1k each way and included quite a bit of 90+ speeds. I'd say the bike has never run better. It turned over 100k on the Savannah trip. FWIW, etc, etc.

Big A fuel injectors for BMW fuel injectors

Date: Mon, 29 Dec 1997 14:02:09 -0400 (EDT)
From: Steve Welsh <WELSH_S@dep.state.fl.us>

Eric, someone about a year ago mentioned "Big A Fuel Systems" # BFS-80-19. $82 list/$37 wholesale. good luck...

Editor's note: It was Richard Meltz, who would be glad to discuss his experience at: Richard Meltz <centaur_cycles@worldnet.att.net>

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5 brands of fuel injectors for K100 fuel injectors

Date: Mon, 29 Dec 1997 23:20:03 -0500
From: Bob Johnson <rjohnson@mail.dnsonline.net>

These are the numbers that I saved. FWIW, I used the Standard injectors for ~$45 each. Definitely a good winter project. Smooth idle and really hits hard at 6 grand.

```
BOSCH:
Stock '85 K100 0280 150 210
'83 BMW 318i 0280 150 211

BECK / ARNLY:
'83 BMW 318i 155 0028 Rebuilt
'83 BMW 318i 155 0234 New

FORD:
'92-'94   4.9   6 Cyl F1ZZ9F593 B

BORG/WARNER:
57076
```

Standard:
FJ27

Fram oil filter for K and Oilhead oil filter

Date: Sun, 4 Jan 1998 08:38:31 -0700
From: Rob Lentini <lentini@azstarnet.com>

Here is data from the Fram catalog:

PH6063 (the actual specified filter for Ks and Oilheads, but expensive and hard to find):

- OD 3 5/64", H 3 3/16", THREAD 3/4" - 16 Straight Th'd,
- RELIEF VALVE 9-11 psi,
- ANTI-DRAIN valve NO,
- filter style 1 (to accept socket)

PH3816 (for 2002 Bimmer):

- OD 3 1/64", H 3 23/64", THREAD 3/4" -16 Straight Th'd,
- RELIEF VALVE 30-37 psi,
- ANTI-DRAIN valve NO,
- filter style 2 (won't accept socket)

PH3614 (for MANY cars. I've been using it for years on Ks and Oilheads, cheap and VERY available):

- OD 3", H 3 23/64", THREAD 3/4" -16 Straight Th'd,
- RELIEF VALVE 9-12 psi,
- ANTI-DRAIN valve YES (doesn't matter),
- filter style 1 (to accept socket, though a slightly smaller one than the OEM socket)

Hope this helps clarify the situation.

> *Caution: the construction of the Fram 3614 filter may have changed.*
>
> **Date:** Fri, 19 Nov 1999 20:28:10 -0500
> **From:** Karl Parr <kparr@mail.wake.tec.nc.us:gt;
>
> Regarding the "Alternate Oil Filters" for a K-Bike, specifically the Fram 3614, you may wish to add a note that Fram has started putting a "sure grip" coating on the bottom half of their oil filters.
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> Anyone wishing to use a Fram 3614 filter should make sure that it does NOT have this coating as it tends to DISINTEGRATE in the oil pan of a K-bike (and R-bike?). Upon chaning my oil today, there were many black flakes of plastic at the bottom of my oil pan.

---

29 Bosch items for K75 bikes

Date: Wed, 4 Mar 1998 16:57:06 -0500 (EST)
From: Steven J. Puig <s.puig@codetel.net.do>

Sure... There are 29 items for K75 Bikes (including alternatives for several items that vary by country & the side of the road bikes are ridden on). The items include (pls. excuse the translation from Spanish) the following:

```
ITEM                                                                PART
NO.

(1) Ignition switch                                                 0 232
101 003
(2) Ignition Control Unit (with an alternative for Switzerland)     0 227
401 003
                                                                    0 227
401 005
(3) Ignition Coil                                                   0 221
125 010
(4) Spark Plug, Super (X 5 DC)            0,60 mm                   0 241
145 500
(5) Spark Plug, Silver (XR 4 CS)          0,70 mm                   0 242
150 501
(6) Alternator (G1 L 14V 28A 22)          until 9/91                0 120
339 546
(7) Alternator (G1 (R) 14V 8/32A)         from 10/91                9 120
333 230
(8) Battery (12V 30Ah 180A)                                         0 180
053 030
(9) Starter Relay                                                   0 332
002 161
(10) Fuel Injection Control Unit (LE2)    until 7/90                0 280
000 332
(11) Fuel Injection Control Unit (LE2.1)  from  8/90                0 280
000 376
(12) Fuel Injection Control Unit (LE2)    from 7/89 (police)        0 280
000 376
(13) Air Volume Sensor                                              0 280
200 040
(14) Pressure Regulator                                             0 280
160 200
(15) Water Temp. Sensor                                             0 280
130 032
(16) Injection Valve                                                0 280
150 210
(17) Butterfly Position Sensor [TPS?]                               0 280
120 302
(18) Fuel Pump                                                      0 580
453 999
(19) Fuel Pump (Treated against parasites [!])                      0 580
463 998
(20) Fan Motor                                                      0 130
007 304
(21) Fan Motor (Treated against parasites [!])                      0 130
```

```
007 319
(22) Rectangular Rt Hand Ride Headlamp                          0 303
750 100
(23) Round Rt Hand Ride Headlamp          Unitl 5/94            0 303
850 109
(24) Round Rt Hand Ride Headlamp                                0 303
851 100
(25) Rectangular Left Hand Ride Headlamp                        0 303
750 600
(26) Round Left Hand Ride Headlamp                              0 303
851 600
(27) Fog Lamp                             Until 9/91            0 305
402 106
(28) Wiring Harness Parts                                       1 987
352 018
```

Regards.

Bosch spark plugs for K1 / K100 4v / K1100 spark plugs

Date: Thu, 05 Mar 1998 11:20:48 +1000
From: Graham Smith <Graham.Smith@cbr.clw.csiro.au>

K1 / K1004v / K1100

I'm working on getting you the part number of the BMW 3 series car oil filters that fit the K's. Most bmw mechanics just see the BMW logo on the filter and assume it's the expensive bike one. => no warranty problems.

The spark plugs are Bosch XR5DC's which can be bought as a Bosch item instead of in a BMW box.

I would not recommend using the NGK equiv, as I burnt a valve in my K1 when i had them in. May just co-incidence, who knows? I stick to the Bosch now, in Bosch boxes.

Regards.

BMW car oil filter for K1100 oil filter

Date: Mon, 11 May 1998 18:22:42 +1000
From: Garry Campbell <camp@coolgold.com.au>

Just a short one to let you know the oil filters I use here in Australia for my K1100 LT are BMW car filters. The part number on them is; 11 421 258 039

Now I'm a little confused, another number on them is 1 258 038 made in Austria.

I can buy about three of these for the price of one from the M/Cycle dealer. They are a little longer in length but have the same guts inside as the K filter.

Take care!

Purolator air filter for K75 / K100 air filter

Date: Sat, 16 May 1998 11:23:36 -0500 (CDT)
From: Rick Landi <RLandi@ix.netcom.com>

I'm using a paper filter from Purolator, model AF-3389, that replaces the stock filter perfectly. I don't know where they came from, how much they cost, or whether they are still available but...

Since I have two left and only replace the filter annually, the answers to these questions haven't been a priority for me. Oh, BTW, the fitment info on the box says BMW Motorcycles K-100 models.

Fram (Mustang) gas filter for K75 gas filter

Date: Wed, 10 Jun 1998 16:13:12 -0700 (PDT)
From: Clarence Dold <dold@rahul.net>

> have a rider who needs the substitute #'s for a fuel filter on a K.
> Some mustang years will sub. right???

The Fram filter for my 1996 Ford Mustang GT, 4.6L, is resting nicely inside the tank of my 1993 K75s. Same fuel pressure rating, 7.9mm rather than 8mm fittings, so you have to tighten the hose clamps a little farther. The body is larger, so it takes finesse to put it into place, but it fits.
Fram G3802A was $8.99 at Kragen auto parts, about 2,000 miles ago.

Yuasa/Exide battery for K100 battery

Date: Tue, 25 Aug 1998 02:37:05 -0700 (PDT)
From: N. Morrison <njm@u.washington.edu>

I have a 90 K100LT and have recently replaced the battery.

In the process of my renewal i have observed that Yuasa have actually got a webpage with specific models designated for various Beemers including R's and K's.(www.yuasabatteries.com)

The actual designation/model number for the K100 is:
Yuasa Yumicron Y60-N24AL-B

interestingly i removed an Exide Edge battery from my k100 with exactly the same designation and took it down to Cascade BMW in Kirkland WA (great store good guys pay em a visit) We compared the two batteries the yuasa and the exide edge and you might not be too surprised to learn that they are one and the same battery except for the nice sticky label on the front.
Exide Edge Y60-N24AL-B

So there you have it the K100 ran fine with the Exide/yuasa by the way,

many thanks Nick Morrison (Seattle WA)

Six oil filter manufacturers for K oil filter

Date: Tue, 8 Jun 1999 19:01:50 -0700
From: Roy Truelsen <royster@worldnet.att.net>

As info, the pressure relief valve on the BMW oil filter is rated at 9-11 psi, same as the Fram 6063. The Fram 3614 is rated at 9-12 psi.

Other alternative filters for the K-bike include:

Amsoil ASF-57
AC Delco PF-53
Hastings 157A, LF157
Motorcraft FL-271, FL-793
Purolator FCO-201, PER-241
Wix 51348, 51785

Roy Truelsen
Portland, Oregon

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>
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> **From:** Karl Parr <kparr@mail.wake.tec.nc.us:gt;
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Four spark plug and seven oil filter manufacturers for K100 spark plug and oil filter

Date: Sat, 7 Aug 1999 08:08:24 -0500
From: Jonathan Hutchins <hutchins@kc.net>

Gathering together information to service my '85 K100, I found some details that didn't seem to be on the current parts list:

Spark Plugs:

- Bosch X5DC (Stock)
- Champion A 85 YC (Old designation per Clymer, 1990)
- NGK 7912 (previously D7EA, per your list)

Oil Filter:
There was a lot of discussion on this ca '95-'96, with the engineering specs for the FRAM coming out as good or better than the BMW filter. Someone else pointed out that BMW does not manufacture their filters, but outsources.

Per Joe Senner:

- AMSOIL: ASF-57
- AC DELCO: PF-53
- FRAM: PH-3614, PH6063
- Hastings: 157A, LF157
- Motorcraft: FL-271, FL-793
- Purolator: FCO-201, PER-241
- Wix: 51348, 51785

Others including Rob Lentini have documented the Fram 3614, and I've used it; it's the only one I've tried.

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An opposing view with cautions on non-BMW oil filters

Date: Wed, 21 Jun 2000 09:15:28 -0600
From: Bob April <drbob27@ibm.net>

Check out

> http://minimopar.simplenet.com/oilfilterstudy.html

and links.

It persuasively (DATA!, large amounts of DATA!) explains why:

1. The IBMWR reference above is inaccurate when it says the Mobil 1 is the same as the Champion (although the page notes that the Mobil 1 is manufactured by Champion), and
2. Fram is not my first choice. Plus - it has a link to a similar page discussing German made filters! Far and away the best comparison of oil filters I have seen.

Oilhead Parts (R bikes from 1994/5)

Deutsch fuel filter for Oilhead fuel filter

Date: Thu, 11 Sep 1997 18:49:33 -0700
From: Rob Lentini <lentini@azstarnet.com>

Since reports are that several of you have experienced fuel filter fracturing in your Oilheads and maybe even Ks, I thought you'd like to know of two alternatives to the expensive stock filter:

Deutsch FF424: Same general shape and tube input/output diameter, steel body (strong!), $2-3 at Autozone. I've had one of these in my R1100RS for 20K.

Deutsch FF330: Smaller body diameter than 424 but same input/output diameter, will work OUTSIDE of the tank and fit in the tight R1100RS right throttle body area under the tank, $2-3 at Autozone. When changing to this run a metal substitute line in the tank in place of the OEM filter.

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NAPA Gold oil filter for R1100 oil filter

Date: Thu, 05 Mar 1998 19:57:42 -0800
From: Gary Wasserman <grw@teleport.com>

Here is a contribution for the page:

NAPA Gold Oil Filter #1348 (equiv. to AC DELCO PF-53/FRAM PH3614/etc.)

The guy in NAPA said they were made by Wix (Wix makes a good filter) but it's hard to confirm this from the package.

I paid $4.95 ea. for my half dozen.

Editor's note: In a second email, Gary added ...

One other tidbit - like the FRAM 3614 the NAPA Gold is too small for the OEM filter socket.

Mobil 1 oil filter for R1100 oil filter (2)

Date: Wed, 8 Apr 1998 23:09:19 -0500
From: Bohumil Kral <bo_vk@email.msn.com>

Greetings to you all - this is my first post.

In the "BMW Part Substitutes" on http://www.ibmwr.org/otech/partsubs.html, article "Fram oil filter for

K and Oilhead oil filter - Rob Lentini" I saw Fram oil filter replacement - # 3614. This filter has an equivalent in the Mobil 1 Oil Filter line : "M1 - 102".

I bought it today (Auto Zone shop) and if I find something unusual about it I will post it. The best about the Mobil 1 filter is the box - it looks great. The price of $10 which is five times higher than regular car filters tells me that the filter was DESIGNED for my R1100RT. ...or the box was designed for it .... or they knew I will pay it at least once.

Editor's note: After being asked "Did it work?", Bo added ...

It fits, does not leak. It is an option, I think you could add it to the substitutes page.

AC and "Car and Driver" oil filter same as Mobil 1 for R1100 oil filter (3)

Date: Mon, 29 Mar 1999 20:47:48 -0700
From: P.H. Marvin <valcyr@flash.net>

I have a K1100LT and read the substitute parts articles with interest. I am not interested in Mobil 1 filters, but I had occasion to look at one today when I bought a filter for my '91 Honda Accord. I compared the Mobil 1 with the AC and...THEY ARE EXACTLY THE SAME, even down to the letter "Y" stamped into the flange area. The only difference I could spot was the AC is painted blue and the Mobil 1 is painted white with a logo sticker. The price of the Mobil 1 was $9.99 and the AC was $2.89. This was at K-mart. I went across the street to Target and bought the SAME FILTER, this time "Car and Driver" brand, for $1.99. So if you are interested in the Mobil 1 filter, save your money and buy the AC.

KRS/LT Mirror Glass Removal

By: Bruce Keahey with some additions by Tom Coradeschi
January 2000

Yesterday, I asked what the trick was for disassembling K1100 RS/LT mirrors from their housings. I received MANY helpful replies (pry it out, you'll break it, just mask it, drop the bike, use a special tool, etc). Follow up conversations several other prezzes resulted in a bit of serendipity, which led me to a "BFO" (tm), a "Blinding Flash of the Obvious", which would require no tools, take little time, would accomplish the task, and leave the parts undamaged. I promised to try it when I got home, report back to the list, and if it worked, submit it it to the tech pages. I am happy to report that the technique worked the first time, and I am submitting this to Tom C. for the tech pages.

To disassemble K1100RS/LT mirrors from their housings, such as might be required to replace a broken mirror or to prepare for painting:

1. Remove the mirror housing from the bike by striking the top outer corner with the heel of your hand while holding it with the other hand so that it does not drop to the ground.
2. Remove the turn signal lens by removing the screw that secures it.
3. Look inside for a wire retainer which may be running from the edge of the mirror, behind the turn signal reflector, to the pivot post for the mirror. Remove it if it is there.
4. On your workbench, spread out a double or triple thickness of towel, a piece of carpet pad or other resilient padding that will not scratch paint. A carpeted floor works just as well.
5. Grasp the mirror housing with your preferred hand, such that the turn signal opening faces diagonally up and to one side, the mounting plate end of the housing is pointed away from you, and the mirror faces down, and parallel with the padded workbench.
6. Raise your arm and slam the mirror housing down on the padded workbench. Do not be afraid to slam it down pretty hard, but do not let the housing bounce upward after impact, either. Since the mirror is recessed within the housing, when the housing meets the padded workbench, the mirror keeps moving downward due to inertia until it snaps free of its mounting and plops out, trapped by the housing rim, undamaged.

The trick took only seconds, worked the first time and so amazed me that I snapped the mirrors back in and repeated it just to be sure. It should also work with other bike models with mirrors similarly mounted.

Prezzes to whom contributory credit is due include John Filak, GaryJH, Garry Graney, Tom Coradeschi, Joe Katz.

K1100 Maintenance Intervals

Action	6,000 Intervals	12,000 Intervals	Annual Intervals
CHANGE	Oil & Filter*	Oil & Filter	
		Gearbox Oil	
		Rear Drive Oil	
		Fork Oil	
		Air Filter	
		Spark Plugs	
			Coolant
			Brake Fluid
CHECK	ABS Sensor Gaps	ABS Sensor Gaps	
	Disk Brake Pads	Disk Brake Pads	
	Clutch Cable	Clutch Cable	
		Valve Clearance	
		Steering Bearing	
		Battery Electrolyte Level	
OTHER			
	Fuel Filter		24,000 Miles
	Steering Head Bearing Lube		24,000 miles
	Renew Chain Tensioner Rail Coating		36,000 miles
	Throttle Twist Grip Lube		24,000 miles

NOTES
*1. BMW intervals. Common opinion holds that engine oil & filter should be changed every 3,000 miles.
2. Dino engine oil should be used until at least 20,000 miles.
3. Synthetic gear oil significantly improves shifting. Mobil-1 recommended.

K1200RS Exhaust Heat Shield Replacement

By Charlie Goodspeed
August 1998

I recently replaced the aluminum cover part of the exhaust on my K1200RS. I had read on the BMW Internet Rider site that it hadn't been done before. Here is a quick description of how to do it:

1. Remove the rear wheel to allow access to the back side of the exhaust can.
2. Remove the 3 bolts holding the hanger place to the exhaust can, and the single nut holding the plate to the bracket. Set the plate aside for reassembly.
3. Remove the 4 TORX screws holding the black cap on the end of the can, and remove the cap. You may need to spray some WD40 or other penetrating oil around the seam to loosen the cap. Mine came off with a few light knocks with a rubber mallet.
4. Use a pair of vise grips and grip the edge of the can at the end of the pipe where the black endcap was. (note: this will mar the surface of the aluminum, so if you are intending to re-use the can, you might want to seek alternative means of gripping the canister.
5. Use a propane torch (not an oxy-acetylene torch - too hot!) and heat all around the end of the aluminum can where it meets the stainless steel catalytic converter. Careful not to burn the passenger peg mounting hardware, or the plastic fender/battery cover. After a good minute or two of heating, use a wooden or rubber mallet to strike the vise grip, knocking the canister off of the stainless steel inners. It may take a few reheats to get it all the way off.
6. When re-installing, slide the new can over the muffler, taking care to ALIGN THE HOLES FOR THE HANGER PLATE. This is tricky, as it is difficult to determine exactly where the screw holes are going to line up. I recommend taking a pencil, and marking a line down the can to the end, so you can visually line up the can with the screw holes as you slide it on. Careful not to twist the can as you push it down the muffler.
7. Heat the end of the replacement aluminum can. When it is all nice and toasty, quickly place the black end cap on the end of the can, and using a rubber mallet, carefully strike the cap to knock the can back in place. This is the only means I had of placing uniform pressure on the aluminum can to get it back in place. I know it sounds potentially destructive, but I completed the job with 4 re-heatings (I worked alone) and no damage to the bike.
   Take your time, and keep the aluminum nice and hot. You may want to lightly sand the inside edge of can end to facilitate ease of installation. Don't sand too much though, as you want a solid fit. There is nothing else clamping the cover in place.
8. To wrap up - simply rebolt the black end cap and hanger plate back on, replace the rear tire, and your done.

BMW K1200RS Service Intervals

formatted for the WWW by Ted Verrill

Service or Procedure	600 Mile Service	BMW Service (6,000)	BMW Inspection (12,000)	BMW Annual	Other Interval
Change Engine Oil & Filter (1)	X	X	X	X	
Gearbox Oil			X		
Rear Wheel Drive Oil	X				**Every 24,000**
Check Valve Clearances & Replace Chain Tensioner Rail facing material			X (4)		
Spark Plugs			X		
Fuel Filter Element (2)					**Every 24,000**
Renew Coolant					**Every 2 years**
Check Batter, regrease terminals			X	X	
Air Cleaner (3)			X		
Check Brake Pads		X	X		
Check front/rear brake fluid levels	X	X	X		
Renew Brake Fluid				X	
Check Clutch Fluid Level	X	X	X		
Check Sidestand Switch	X	X	X		
Lube sidestand		X	X	X	
Check Centerstand, lube if necessary		X	X	X	
Check fit of rear wheel bolts	X				
Clean inductive signal transmitter at rear wheel	X		X		
Read out MoDiTeC fault memory	X	X	X	X	
Check throttle cable play, adjust if necessary	X		X		

NOTE: Always change fluids when engine at regular operating temperature.

1. If motorcycle is used for only short journeys or at temperatures below 0C, every 3 months and at least every 1,800 miles.
2. If fuel is of poor quality, every 12,000 miles.
3. If dirty or dusty conditions, replace every 6,000 miles.
4. Replace tensioner rail every 36,000 miles.

Basic instructions for installing the "BMW Muffler Repair Kit" PN 95 00 9 000 390

The repair kit consists of a mount, which is a cadmium plated steel sleeve, new mounting bolts and standoff spacers.

The sleeve is installed in much the same fashion as a "Molly Bolt(tm)" in that it is placed into a hole in the muffler and then "pulled up" against the muffler body. This causes the shank of the mount to expand and lock into place.

The instructions below illustrate this (yes, the photography leaves a lot to be desired) using a piece of sheet metal scrap for most of the steps.

1. Remove any remaining parts of the original mounting hardware.
2. Drill a hole in the center of the location of the OE mount. 3/8" diameter seems to be about right.
3. Insert the body of the muffler mount into the hole.
4. Acquire and prepare an installation tool of some sort. My dealer had one, which he claimed cost him ~$120US and which he refused to lend me (he claimed that customers had broken them in the past). Not really ready to shell out a C-note+ for something I'd only use once, I made my own from a bolt, a nut and a couple of washers:-}
5. Holding the bolt in place and turning the nut will pull the body of the insert up against the shell of the muffler. It will swell, as shown, and lock itself into place.
6. Repeat for all other locations (I only did the ones where the OE mounts had cracked) and re-install the heat shield, using the provided bolts, standoff spacers and wave washers. A dab of LocTite(tm) on the bolts won't hurt, either.

Integral Bag Leak Repair

By Ross Brown
September 1998

Since new my integral cases leaked. The lid pressing on the seals in time caused them to settle and lose their water tightness. This simple solution works well and has fixed the problem.

To simplify the explanation I refer to the "lid" the part that opens and the section of the case that fixes to the bike the "base".

There is a "lug" which is the part of the lock that is pop riveted (2 rivets) to the "base". With a sharp point I scribed around the lug so I would know the original position when reassembling then drill out the 2 rivets, removed the lug, and elongated the holes in the lug. The plastic they use in the lug is very difficult to enlarge with a drill so I used one of those rotating leather punches and snipped a little plastic away from each side of the hole. The reason for doing this is so the lug can be moved in and out on the base to get sufficient tension to prevent leaking when the lock cams shut.

Bought some 3 mm or equivalent "cap" bolts (Allen head bolts) washers, and nylok nuts from the local hobby supplier. You need to use bolts with Allen type heads as bolt the heads are in a recessed hole inside the case.

Reassemble by inserting the bolt from the inside of the case with lug then washer then nut on top. I applied a little silicon grease under the lug to discourage water working its way down the bolt thread and into the case. The main part of the lock attached to the lid will clear the bolt heads when clipped over so long as the bolts length is kept to a minimum. Since the original position of the lug was marked the lug can be initially tightened down a fraction closer towards the bike.

Caution..... the lug only needs to be moved slightly from its original position to get a proper seal you don't want to compress the seal more than necessary and don't over tighten the nuts. Trial and error using a garden hose will let you know the correct position of the lug. This really doesn't take long to do and allows you to adjust the lid tension anytime.

If you wanted a quick fix you could just glue a piece if something to the inside of the lug causing the lock to cam in tighter but this does not give any adjustment. Also don't over pack (probably the main reason for leaks) the case as this distorts the case lid and causes improper sealing.

I have also removed the "press studs" on the strap that stops the lid opening too far and fixed it to the base of the case with small bolts. I had the bike on the side stand once and opened the left hand side case the lid slipped from my hand the press stud unclipped and the painted lid hit the ground scratching it. Since I always use the internal bags I have never needed to open the lid further than the straps permit. So unclipping is not necessary. Also the pop rivet securing the male section of the press stud to the base of the case becomes loose with use.

Another problem to be aware of particularly with the left hand case. This is more a problem for the inexperienced user but it is possible to attach the case to the frame and lock it on and the case not to be fully clipped over the frame at the back of the frame rail. This causes the case to sit up slightly at the back and is not always obvious and could cause the case to fall off if a pot hole is hit. I always double check that the cases are fully clipped over the frame rails when I put them on.

It may be obvious, but I always lock the case to the bike and keep the lid locked. I often think it is the reason why so many cases are lost while riding.

K-Bike Sidestand & Clutch Adjustment

By Brian Curry
April 1998

Here is how I do it. Note that the presetting of the exposed cable length, is primarily for setting the "auto-retract" of the sidestand.

Put the bike on the center stand.

First, disconnect the clutch cable ends and check they are clean and lubed. I levered the trans end clutch lever in a bit and slipped the barrel out of the fork. I almost can do it with my hands. With that end disconnected, pull the handle bar end to the grip and look underneath. You can wiggle the free barrel down and out and the wire will drop through slot. Clean and lube.

Remount the cable. Grip end first. (I use grease to help hold everything in place, at the grip end especially.) The compress the trans end lever and put the barrel back in the fork. The grip end barrel is not captured by the cable. The trans end is.

I bent some wire to the 75 mm length.

```
|                         |
|<---------75 mm-------->|
|                         |
|_________________________|
```

This makes the measurement easier. Push the rubber sleeve away from the end of the sheath end. Measure from the end of the cable end sheath steel sleeve (Not the plastic which might be trying to slide out.) to the inner end/side of the barrel. Adjust the grip end adjustment for the 75 mm exposed. There should also be some clearance between the clutch fork and another lever that come up from below and is below the cable end of the clutch fork and the pivot point.

This PROPERLY positions the clutch operation lever to bring up the sidestand so get it right!

Then, look at the other end of the trans end clutch fork lever. It has a lock nut and adjuster bolt. The adjuster bolt takes a 10 mm and lock nut 13 mm. Loosen the lock nut. Adjust the 10 mm adjuster so that you have the ~1/8" travel at the grip. That ~1/8" is at the open end of the V that forms as the grip lever is pulled back. Tighten the lock nut. This will change the adjustment bolt a bit, so check and futz with it until it is right.

While you are there, look at the rubber boot that the adjustment bolt goes into. If it is wet, it is leaking and needs to be replaced.

With the clutch cable length set so that there is enough travel and the clutch fork at the trans end in the right position, and the clutch set so the springs can do their best to compress the clutch disk, the auxiliary function of retracting the sidestand can be set.

When the clutch fork cable end moves forward as the clutch lever is pulled in, it contacts another lever pointing downward, pushing it forward. Naturally the lever lower end moves backward.

The lower end has a rod going through it that travels forward to the sidestand. Since the lower end is moving backward with the rod, it pulls the sidestand back allowing it to retract.

The sidestand mechanism is a "center over mechanism." The rod only has to pull it over the center "hump" and then the springs pull it back the rest of the way to rest next to the muffler. The rod and clutch lever do not pull it all the way back. The two springs you see, pull it the rest of the way back after it gets over the hump.

The rearward end of the rod, where it connects to the lever actuated by the trans end clutch lever, is threaded. A semicircular metal bit is threaded onto the rod and is captured by the sidestand actuating lever. (The sidestand actuating lever is spring loaded to keep tension on the rod and semi-circular piece so it can not fall out.) With the sidestand up, (This takes tension off the rod.) push forward on the lever bottom, while pulling back on the rod and thread the semicircular piece forward. This takes up the slack making the clutch actuating lever act sooner, and takes it "over the hump".

Put the sidestand down and check that actuating the clutch gets it over the hump so that it fully retracts. When the sidestand is down, there should still be space between the sidestand lever and the clutch lever.

Do not over adjust the semi-circular piece! If you do, you can screw up the clutch adjustment. :(:(

The sidestand pivot point needs to be kept well lubricated. If it is not, it will not self retract once it is "over the hump". BTDT The two springs should be good for the life of the bike.

One important thing. This adjustment SHOULD BE a do it once and forget it. If you need to do it again, something big changed. The likely thing is that you, or someone, tried to pull in the clutch (I have never figured out why some people "have" to operate the levers. It is can be even worse if the front wheel is off, and they go for the brake lever.) with the bike on the sidestand. If they try hard, they can pull the cable through one of the barrels. This is not a good thing. It means the barrel is half off the cable. It can then fail at the worst time...

Bike Support for Spline Lube

By Darrell Classen
April 1998

I use a floor jack under the engine to raise the rear end up off the ground. With the saddle bag rails off I slide a saw horse under the rear end of the bike. This makes a very stable work area.

As a precaution I have eye bolts bolted through the rafters and tie downs going to the handle bars. The angle of the tie downs is not quite 45 degrees. I have not tested to see if the bike fell over whether the eye bolts would hold the weight as the eye bolts are rated at 400 lbs each.

I have 171,000 miles on my 1990 K75RT and still have used up only 1/3rd of the clutch.

How To Check a K Battery WITHOUT Disconnecting The FI Computer

By: Sam Lepore
March 1999

> Credit Due: The information for this article came from **Scott Jenkins**, a wizard mechanic who also happens to be the Service Manager at *BMW, Ducati, and Triumph of Marin* in San Rafael, California. Thanks Scott!

Sometimes motorcycle batteries seem to last forever. Or, sometimes they make you wonder why the average life of a motorcycle battery is so much shorter than the average life of a car battery. I mean, after all, a bike battery is smaller than a car battery so it should last longer, right? Maybe. Probably not.

While I have had relatively good experiences with the longevity of BMW batteries on my R100RT, my 1995 K75RT is on its third battery in three years. The first two were made during what I later heard was "a bad batch from Spain" (?) and the second didn't even last three months before it went flat.

So all of this convinced me that even though I used to check the R100 battery every other month or so, I would have to pay much closer attention to the K battery. Fearlessly I removed the sacred document known as the Rider's Manual from its honored resting place in the tail cone of the K75. Happily I turned to the official ritual for checking the battery ... Fearfully and sadly I returned the Basic Beemer Bible to its tabernacle.

Disconnect the Fuel Injection Computer ??? After the problems I've heard on the IBMWR list about mistreating that unit, I was, shall we say, reluctant. Ahhhh, what the hey. Let's give it a try.

1. Follow instructions very carefully.
2. Curse instructions vociferously ... that FI connector is not going to budge without a LOT of force.
3. Re-read instructions carefully.
4. Re-curse at lack of recourse ... **pry** the connector with a screwdriver ??? who are they kidding?

That's when Scott came to the rescue. At my next visit with the friendly staff at BMW Marin, I mentioned that I couldn't get to the battery. When Scott smiled that "You dumb ***, you should have asked me first. :)" smile of his ... I knew, well, I should have asked him first.

Here is a simple way to access the battery *WITHOUT* disconnecting the Fuel Injection computer:

1. **Remove both side panels.**

The K side panel has a three-point mount, consisting of a pop-grommet at the upper front, an open hook around a post at the bottom, and a plastic pin-in-socket at the upper rear. Photos 1 and 2 show the left side panel. Pull firmly but smoothly with your fingers under the panel as close to the grommet pin as possible. You can use the frame tube as a visual guide. The grommet is attached to the side of the frame tube - on the side toward the rear of the bike. (Opening the seat may make it easier to see the grommet.)

Remove the side panels

Pull the front at the grommet pin

Photo 1

Don't twist the panel out too far

Photo 2

Then move the panel vertically straight down to unhook the second mounting point. Finally, *carefully and slowly* pull the rear pin out of its socket. It may help to twist (rotate) it a little, but be gentle - this is soft plastic and is the most likely point to break.

2. **Release the FI computer latch pin.**

On the right side, just above the coolant overflow tank, a black plastic pin holds the FI in its cushioned mounting tray. The pin snaps into the rubber grommet that supports the tray on the overflow tank. It is easily removable with pliers and may even be pulled with strong fingers. Photos 3 and 4 show the pin being removed.

Release the FI latch pin

Use pliers or fingers

Photo 3

Watch it ... this is a crevice seeker

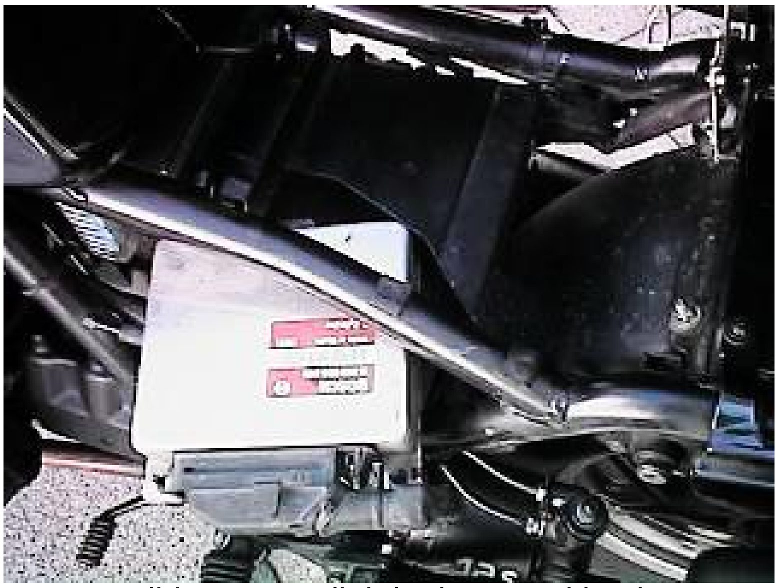
Photo 4

3. **Slide and pivot the FI computer out of the tray.**

Start pushing the FI computer from the right side where you removed the pin, and guide it with your left hand so it comes out, slightly down, and slightly back. The FI connector cable is probably zip-tied to the frame, so you should work this around the frame as the unit slides out. There should not be any strong force or binding anywhere in this movement. If something is "stuck", stop and see what it is. The very first time you do this on a bike that has seen some years on the road, the unit may be snug because of accumulated *gorp* (which is a highly technical description), but once it moves it should slide easily. Photo 5 shows the slight down/back angle of the FI computer just before it is clear of the tray. Pull it all the way out and let it hang.

Then remove the plastic tray. It sits on four rubber mounts and slips out up and back. Photo 6 shows the tray being removed. There are three grommets on the tray itself which cushion the FI ... make sure these stay where you can find them later.

Move the FI, Remove the tray



Slide FI out, slightly down and back
Photo 5

Slide tray out, up and back
Photo 6

4. **That's it !**

You now have access to the battery from the top and the FI connector has not been traumatized by your assault on the battery. :) Photo 7 shows the FI hanging from its connector.

Don Eilenberger added: "IF you've replaced the BMW battery with another brand - the positive terminal may not have the very nice insulating cover over it that the factory battery has. In this case - it would not be difficult to short the case of the komputer on the positive battery terminal.

This would NOT be a GOOD THING. It could easily cost you a new komputer, or perhaps a wiring harness. To avoid it - I always place a piece of cardboard directly over the battery terminal so it can't short."

Just hanging around for you
Photo 7

When putting it all back together ...

Putting it back is just as easy. Position the tray on its four mounting points. Slide the FI computer into the tray. Again remember to work the FI cable around the frame as you slide the FI into the tray.

Before you put the FI latch pin in, be sure the three cushion grommets on the tray are in their proper grooves and the FI is not resting directly on the tray.

The FI latch pin makes no sound when it snaps into place. Verify the head of the pin makes contact and is flat on the FI flange so it does not work itself loose.

Be gentle again when installing the side panels. The rear pin just barely goes into the socket ... line up the bottom hook under its post, then press the upper left pin into the grommet. A little rubber-friendly grease on the pin will make the next removal a lot easier. Greased or not, the pin makes no sound when it snaps into place. Give it a tug to be sure it is seated.

"The Electricity's Gotta' Be In There Somewhere!"

By Don Hamblin
August 1998

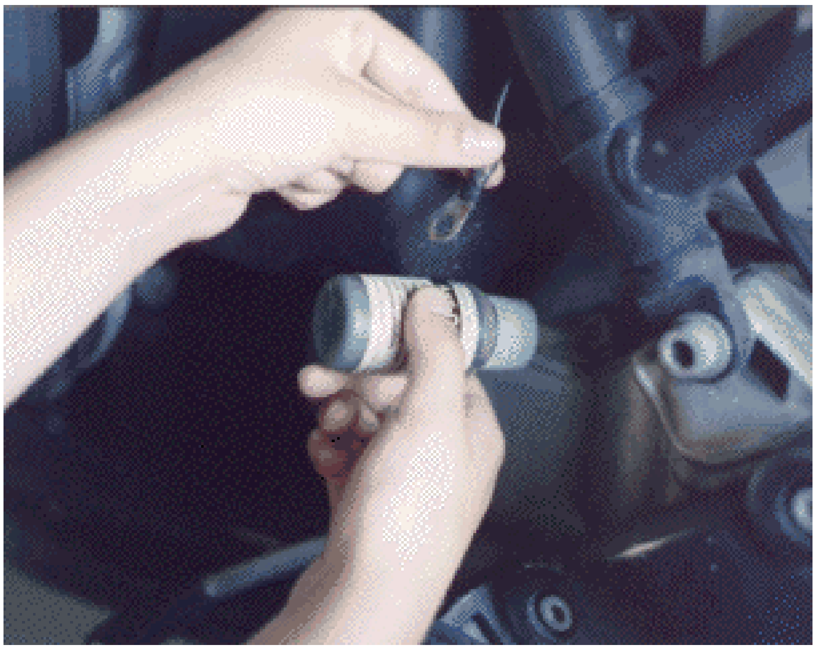
That faithful old "K" of yours won't start when it's hot, the battery idiot lights "glow" weird at high or low RPM's, you now have to pull in the clutch to start it, the gear indicator goes "blank" from time-to-time, sometimes the engine just **stops,** you might even be starting to actually ***hate*** the darn thing, or you've owned it for over three years. If you're experiencing any of these, it's time to "pull" a service not listed in any shop or owner's manual. If you think that I'm asking you to add to the already long list of time consuming tasks to maintain a "K" then you could be ***dead*** (and I used that word on purpose) ***right!*** Dead, because if it hasn't stranded or embarrassed you yet, it's planning ondoing just that!

We're dealing with two related problems here. Neither of which can be found in the owner's manual or any of the shop manuals I've seen.

The first is that the newer (not to be confused with my older /2) BMW's are actually reliable! (Before somebody tries to lynch me, let me say that I put almost 70,000 enjoyable miles on my R69S, tuning it up and tightening all the nuts and bolts every 2,000). You can go for so long just putting gas and oils in them that you forget that there's other "stuff" in there that just might need attention.

The second thing is that on these "newer" rides, ***the old mechanical systems have been replaced by electronic systems.*** But more importantly, the wires no longer go directly from the generator to where the action is. The ***new*** wires are now "broken up" into shorter lengths, which are connected with "*other than*" copper connections (just like that new *suburban assault vehicle* you see in all the upscale subdivisions). That makes assembly and parts replacement easier, and therefore your retail price lower (yeah, that bike could have cost even more). Those connectors usually do work really well. Most of the time they seal out any moisture. But that also means that they can seal "in" any moisture. Where can you get moisture when you're afraid to ride in the rain? Here in Alabama there's more than enough in the air! (In the summer time we can't let kids sit too long in the back yard, it's so humid that moss grows on their north side.)

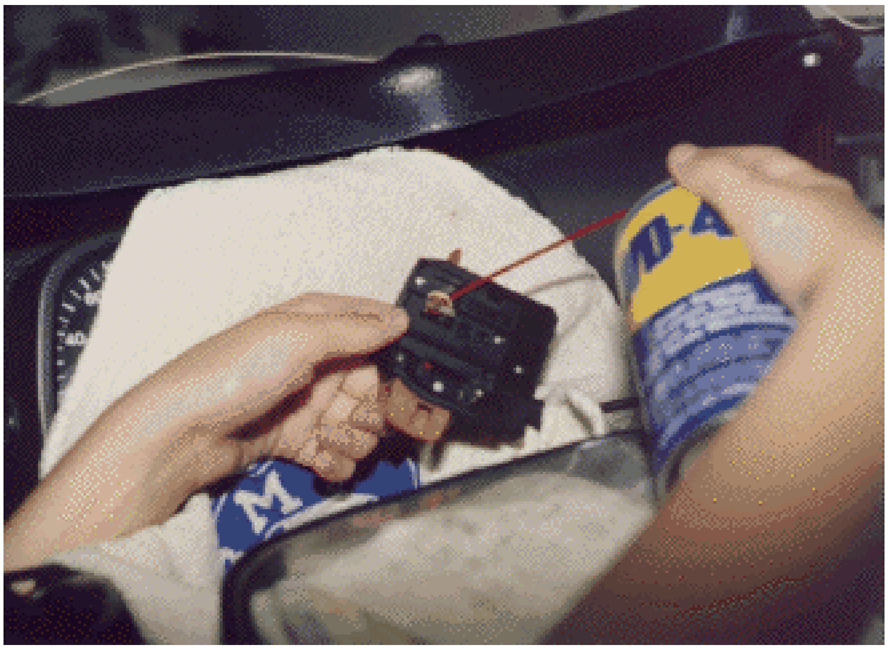
So now I'd suggest scheduling a full day, once a year, for cleaning ***every connection and switch contact on the entire motorcycle!*** I don't mean just take the connections apart; I mean really ***clean them!*** It's a pay me now or pay me later. If you don't do that, expect to spend a couple of hours sitting by that gas pump waiting for something to cool off enough to let the bike run again. Or trying to find a pay phone to call somebody from the *BMWMOA Anonymous Book* to trailer you home. I've been there; it ain't fun.



Start at the battery ground. If you hear a "*creek*" while you loosen the bolt, it's a sure sign of corrosion where the electricity should be flowing through. Shades of things to come. Clean the bolt and face of the cable connector with wet or dry paper (or even an ink eraser) then coat with dielectric grease (or WD-40, Vaseline, etc.). Dielectric grease is available in a tube from NAPA dealers, but I'd found some at a Home Depot, a couple of years ago, that was "thinner" and easier to use. That will keep the corrosion from coming back for a while. Leave the ground disconnected, disconnect the other cable, and cover both connectors with electrical tape (you want electricity to flow, but not fry the semiconductors.)

Then start following the wires. Each time you find a connector, go through the cleaning. You can use a contact cleaner, but make sure that it's compatible with insulation and plastic. Otherwise, try WD-40. Back up your work with a shop towel to keep the cleaner off the paint and other parts. "Work" the connector in and out to assure you've gotten the "contact patch" clean. Then apply some dielectric grease.

You'll have to either remove or prop up the tank to get a lot of the more important connectors. The one for the ignition switch might be causing the idiot lights to all come on while you're running. It can also cause the engine to die in the middle of your favorite curve. Just a little corrosion is all it takes. If you still have trouble with those symptoms, it might be time to just replace it. I did the cleaning and gained a couple of months "life" from mine. Long enough for mail order to catch up. Detailed cleaning instructions for the switch can be found at the following link:
http://www.ibmwr.org/ktech/clean-ignition-switch.shtml



Pay close attention to the bar switches. You'd be surprised how easily they corrode. That's where that soft glowing battery light comes from! Spray in your cleaner (or WD-40) and "work" the switch. I'll bet that you'll see a lot of dirt and ***grunge*** running out of the openings. Keep it up until it runs clean. Then pour in some of the dielectric grease. Help with the bar switches can also be found at:
http://www.ibmwr.org/ktech/headlight-switch.shtml

After you've cleaned all the connections you can find, open the "box" for the relays. Pull each one out and clean their prongs (forks?). A connection's a connection. Don't skip these.

Now comes the "dirty" work. If your bike's got over 40,000 miles on it, it's also time to service the starter. If you've ever had any trouble with the starter just not turning, this might just be the problem. You'll also have to remove the battery, but this is also a good time to inspect the pad it sits on. Paint-by-numbers directions for the starter service are at:
http://www.ibmwr.org/ktech/starter-cleaning/index.shtml

I'd also recommend checking the multi-pin connector for the main computer. Please be real careful with this one, it's even more expensive than the ignition module under the tank. Just clean the connectors and apply the grease. That computer knows more about how your motorcycle is supposed to run than you do, so let it talk to the rest of the machine.

As you finish up the main wiring, watch out for stragglers. There's the neutral switch (a loose wire there will drive your gear indicator and clutch lockout crazy)! Each and every light bulb goes into a socket. Let any of those corrode and you'll one day find out just how *dark* that **dark** can get.

You might still have to replace a $400+ ignition control module, but at least you'll have cut out all the easy fixes. You could actually start to ***like*** the bike again. And all this can be completed during one cold and rainy day in the garage. It's a pay-me-now or pay-me-later, so it's real good to schedule that payday for the middle of February - ***every year!***

*My thanks to Paul Glaves (*BMWON *Technical Editor), Gene Pollock (Gene Pollock Battery Service), Rick Jones (Motorrad Elektrik), Rick and Jay (at Engle Motors in Kansas City), and John Zibell (a Guzzi guy) for holding my hand while learning these valuable lessons. And also, my teenage daughter for posing in the pictures!*

Electrical Box Contents

By: Paul Glaves
March 1999

I have sorted out the components in my K75 electric box. They do not match the chart in the Clymer K bike manual which appears to be totally flakey. They do match several photos in the Haynes manual and have been field verified. Haynes does not have a complete chart.

I have 9 components in the box - two are (optional).

Starting left to right across the front:

1. Small Black - Fuel Pump Relay
2. Blue Bosch 30A - (Optional) Low Beam Driving Light Relay
3. Blue Bosch 30A - Headlight/Load Shed Relay
4. Blue Bosch 30A - Horn Relay

Center Row left to right

5. Black Rectangular - Bulb Monitoring Unit
6. Blue Bosch 30A - (Optional) High Beam Driving Light
7. White Rectangular - Temperature Control Monitor - Fan Relay

Back Row left and right

8. Large Green Rectangular - Turn Signal/Flasher Unit
9. Black Rectangular with bolt on wires - Starter Relay

Note that 2, 3, 4, and 6 are identical 4 pin Bosch 30A relays. When I added the optional factory driving light kit I could have reversed the sockets for 2 and 6. The sockets came as part of the kit and just plugged into an existing plug.

Assuming they bolted the relay sockets in the same as on mine, your K100 should be the same. It looks possible to reverse the sockets for the Headlight and Horn in the right front corner but that's about all that could be different. For what its worth Clymer showed the black fuel pump relay up in the right front corner - mine isn't there!

Mine are getting numbered stickers with a number key in the lid, but now that I've finished doing this I might remember anyway.

Pictorial Recap:

```
                              FRONT

Fuel Pump     Driving Light     Headlight     Horn
  Relay           Relay           Relay       Relay
               (Optional)
```

Bulb Monitor Unit

Driving Light Relay (Optional)

Fan Relay

Turn Signal/Flasher Relay

Starter Relay

BACK

Flasher Relay Repair By Steve DeForest
June 2001

Hi, 1986 K 100 RS.

The other day I had the turn signal fuse pop on me. I removed the tank and inspected the wiring harness for chafing and other obvious defects. Then I installed a new fuse.

Now the left side turn signals were on, including the dash light, but none were blinking. Neither would it cancel and turn off.

So I got out my trusty Haynes manual and found the schematic for my bike. I found that unlike cars where the flasher unit is the last thing before ground electrically, these bikes put the flasher unit immediately after the fuse.

I originally suspected a bad switch, which is a possibility, but when you combine that with no flash, I decided to check the flasher unit first.

The flasher is about 1" by 2.5" by 2". On my bike it is mounted to the back wall of the electrics box. I dismounted it and unplugged it.

Looking at the bottom of the flasher you will notice a single tab on each side. This would lead you to believe that the plastic cover would be removable. You would be correct.

Upon removing the cover, you will notice there are many resistors and transistors and two conspicuous relays. These relays are what causes the turn signals to blink.

The points on one relay had arced and stuck shut. I pulled the contacts apart with a small screwdriver and sprayed some contact cleaner on the contacts. Then I reassembled the relay installed it on the bike and tried the blinkers.

The system now works as advertised.

If this info would be of help to someone out there, feel free to edit it and post it on the site. Happy motoring and keep the rubber side down!

Steve DeForest

ABS Diagnostic Data

By Andy Keatley
January 2001

Please find to follow copy of letter to Brian Curry re: ABS diagnostics. Hope is of interest.

Dear Brian,

I found your information on ABS diagnostics via a link from a very good British BMW breakers site http://www.james-sherlock.co.uk/.

With your info along with Richard Paton's I have fixed my 16v RS's fault.

However I found readings for resistances into the modulators as below:

Computer connector pins:

Front		**Rear**	
6(-) to 9(+)	4.4K	7(-) to 11(+)	4.4K
6(-) to 10(+)	1.9M	7(-) to 12(+)	2.1M
9(-) to 10(+)	1.9M	11(-) to 12(+)	2.1M

I suspect the readings depend upon how much current the meter used injects. Maybe there is an active device of some sort, probably a darlington power transistor to drive the coil in the unit because using the diode check function on my meter (Fluke85) I obtained the following readings:

Computer connector pins:

Front		**Rear**	
6(-) to 9(+)	1.79V	7(-) to 11(+)	1.79V
6(-) to 10 (+)	1.59V	7(-) to 12(+)	1.59V
9(-) to 10 (+)	1.49	11(-) to 12 (+)	1.50V

Hope this is of interest and thanks for your very useful information.

Regards Andy Keatley
Dartmouth
England

Clearing ABS-I (and possibly II) Faults

By Richard Paton
April 1998

Well, I've now tried disconnecting the battery for over 1/2 hour ... the ABS control unit must have some sort of non volatile storage inside. It looks like the only option for resetting the fault code is to go to the dealer to have the codes read out ...

If you do *not* need to reset the ABS, follow the instructions below to save yourself much moolah later on.

1. Save this email
2. Add a 20 cm piece of wire, stripped at both ends, to your tool kit.

If you do not know whether you need to reset:

1. Stop.
2. Turn off ignition.
3. Turn on ignition. If both ABS lights flash together, you are OK. If the lights flash alternately, you need to reset your ABS.
4. If, having reset your ABS, the lights still flash alternately, you need to see your dealer.

If you **do** need to reset the ABS, follow the instructions below:

1. Remove rider and pillion seats. Turn ignition off.
2. Locate wire that runs under the rider's seat up the middle of the rear mudguard, looking like it is going to disappear under the tool kit.
3. Pull said bit of wire out from under toolkit. Exclaim "Well, I'll be buggered" when you see that the 'plug' it plugs into is merely a blank.
4. Unplug blank.
5. Insert one end of 20 cm wire into the **middle** socket hole of the above wire.
6. Ground the other end **firmly** to a metal bolt in the area (and keep grounded).
7. Turn on ignition. Note that the two ABS lights flash alternately.
8. Hold ABS button down for 8 seconds. The bottom ABS light will stay on, and the top one off.
9. Release the ABS button. If you have successfully reset the ABS, both ABS lights will come on. If you have failed to count to 8, or your ground is not good, the top ABS light will stay off.
10. Turn ignition off, put wire back in your tool kit, reconnect and stow blanking plug, and send cheque for half what your dealer would have charged you for this service to a charity of your choice (preferably me).

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24 hours in a day. 24 cans of beer in a carton. Coincidence? I think not!

ABS Reset Instructions

By Jim Johnson
June 2001

Following is the sequence which allowed me to reset the ABS-I system on my 1990 K100LT:

Providing you know for sure that nothing is wrong with the ABS-I system, here is a method to reset it for this particular bike.

Symptoms:

Battery was out of circuit (dead) for more than a few hours. Upon inserting new battery and starting, ABS-I lights would not go out. *Both lights flashed simultaneously* Punching the ABS switch would cause both lights to stop flashing but remain on.

Tools:

1. Approximately 1 foot of wire with an alligator clip on one end.
2. Ignition keys.
3. Cold beer.

Procedure:

1. Remove right side cover.
2. Locate 3 pin terminal tied to upper frame member.
3. Remove dead end blank from 3 pin terminal.
4. Plug bare end of wire into middle socket on terminal.
5. Ground alligator clip firmly to engine.
6. Press ABS switch and hold.
7. While holding ABS switch, turn ignition switch on and hold for a count of 20.
8. Turn ignition switch off.
9. Remove wire, reinstall dead end blank, snug everything up and replace side cover.
10. Place wire with tool kit for possible future use.
11. Stand back, drink beer and say. "Well, I'll be damned!!"
12. Start bike and drive away happy!! ;-}

Kudos on this method are varied. Previous posting for clearing ABS faults by Richard Paton were generally correct but were not right for my bike. David Strauss of the /2 list serve (yes, i have a /2 also!) provided details more specific to this bike.

caution!!! this is for an operable abs-i system. please refer to other instructions on this page if your symptoms are other than those above!

cheers!!
jim johnson
1963 R60/2 "UUUGLY"
1975 R90/6 "BLUE MULE"
1990 K100LT "BLUE OX"

ABS I Diagnostic Methods

By Brian Curry
September 1998

Generally when the ABS lights start flashing, people start seeing dollar signs since there seems to be very little info on it out there, and what is there, has you testing using the BIG DOLLAR $$$ BMW test tool.

This is some info on how to find out what is causing the fault using a Volt Ohm Meter (VOM) and then how to investigate and narrow it down more using that same VOM. This is written based on ABS I. ABS II is similar, but has different codes.

The fault code is indicated at the diagnostic connector that the BMW tool connects to. On my K75 the diagnostic connector is located on the bike right side under the side panel. It plugs into a blue "blank" connector tiewrapped to the frame. There are three pins on this connector. I was not able to detect any voltage on the outer, number 1 and 3 pins.

The center, number 2, pin is where the fault codes are indicated. This pin has about 0.5 to 0.75 volts on it with the bike shut off. When the ignition is turned on, the voltage rises to about 10 volts. When all is well, it stays at 10 volts. However, if there is a fault, it drops towards zero (pulses) in a periodic manner. When there is a fault, every so often, the voltage pulses downwards toward 0 volts. The number of pulses, indicates the fault number. In other words, if it pulses downwards 4 times, that indicates that there is a problem with the fault code number 4 items. The pulsing also occurs when the ignition is first turned on and the voltage is rising to ~10 volts, but it is easier to spot when it occurs periodically later. I was able to see the pulses easily using an analog meter. It can also be seen using a digital meter. There is not enough current available to light a light. I tried.

With the fault code number, troubleshooting can proceed.

First the ABS plug is numbered as shown below. Yes, it is a PITA to get the ABS brain out and the plug disconnected from the ABS I but some tests have to be done from there. With the pin sockets toward you, and the cable on the right, it is numbered from the right to the left, bottom and then top. This is important.

```
   25                                   14
  ________________________________________
 |                                        \_________
 |                                         _________  Cable
 |________________________________________/

   13                                    1
```

System voltage test. Power is supplied on Pin 15, and Pin 14 is ground. Connect to them, and confirm that when the ignition is turned on, the voltage is the same as at the battery.

Fault Code 1 - Front Pressure Modulator

ABS connector pins of interest	6,9,10

Test Value	resistance
Resistance 6-9	~4.48 k-ohms
Resistance 6-10	~16.7 K-ohms
Resistance 9-10	~19.5 K-ohms

If an open is indicated, check the wires from the brain plug to the Modulator plug. If those connections are OK, the modulator is bad.

Remove the ABS relay in the electrical box under the tank. The relay is at the front of the box, on the left side, just beside where the front wiring harness enters the box. Measure resistance from the ABS relay socket to ground. Measure from 87 to frame ground. It should measure 17.4 K-ohms.

Socket:

```
          30
      _________
     |    __    |
     |          |
 87  | |      __ | 86
     | |  __     |
     |_________|
          85
```

Again, if it is open circuit check from the socket to the Modulator plug. Then check from Terminal 31 of the Modulator to ground. Again, if the wiring is good, the modulator is bad.

With the ignition off, the ABS relay socket connection Pin 30 should be the same as the battery voltage. If not, check that connection point is secure, and the red wire from the battery to connection point 30.

Fault Code 2 - Rear Pressure Modulator

ABS connector pins of interest	7,11,12
Test Value	resistance
Resistance 7-11	~4.48 K-ohms
Resistance 7-12	~16.7 K-ohms
Resistance 11-12	~19.5 K-ohms

If an open is indicated, check the wires from the brain plug to the Modulator plug. If those connections are OK, the modulator is bad.

Remove the ABS relay in the electrical box under the tank. The relay is at the front of the box, on the left side, just beside where the front wiring harness enters the box. Measure resistance from the ABS relay socket to ground. Measure from 87 to frame ground. It should measure 17.4 K-ohms.

Again, if it is open check from the socket to the Modulator plug. Then check from Terminal 31 of the Modulator to ground. Again, if the wiring is good, the modulator is bad.

With the ignition off, the ABS relay socket connection Pin 30 should be the same as the battery voltage. If not, check that connection point is secure, and the red wire from the battery to connection point 30.

Fault Code 3 - Front Wheel Speed Sensor

ABS connector pins of interest	1,2
Test Value	resistance
Resistance 1-2	~135 +/-20 ohms

If the reading is an open circuit, measure resistance from ABS connector pins 1 and 2 to the frame ground. It should be an open circuit. If it is not, check the wiring to the speed sensor. If the wiring is OK, the sensor is shorted internally and it will need to be replaced.

If resistance reading is not correct, check wiring from pins 1 and 2 to the front wheel speed sensor, and the plug connection at the front wheel speed sensor. If the wiring is good, the speed sensor is bad and needs replacement.

If the resistance reading is correct, replace the ABS brain.

Fault Code 4 - Rear Wheel Speed Sensor

ABS connector pins of interest	3,4
Test Value	resistance
Resistance 3-4	~135 +/-20 ohms

If the reading is an open circuit, measure resistance from ABS connector pins 3 and 4 to the frame ground. It should be an open circuit. If it is not, check the wiring to the speed sensor, if the wiring is OK, the sensor is shorted internally and it will need to be replaced.

If the resistance reading is not correct, check wiring from pins 3 and 4 to the rear wheel speed sensor, and the plug connection at the rear wheel speed sensor. If the wiring is good, the speed sensor is bad, and needs replacement.

If the resistance reading is correct, replace the ABS brain.

Fault Code 5 - Battery Voltage Too Low

Power (~12.6V) is supplied on Pin 15, and Pin 14 is ground. Connect to them, and confirm that when the ignition is turned on, the voltage is the same as at the battery.

If not: Check the battery charge and condition (Load test.) Check the pin 14 to frame ground connection. Check the battery, frame, and engine ground connections. Check ABS connector pin 15 to ignition switch terminal 15. Check wiring from the battery positive connector to the ignition switch.

If all the wiring is OK, replace the ABS brain.

Fault Code 6 - ABS relay

ABS connector pins of interest	17,19
Test Value	resistance
Resistance 17-19	<92 OHMS (LESS THAN 92 OHMS)

If an open circuit is indicated check ABS connector pin 17 to the ABS relay socket terminal connection 86, and check ABS connector pin 19 to the ABS relay socket terminal connection 85. If the wiring is good, then check the relay.

If the resistance is off, measure between relay terminals 85 and 86. If it is not less than 92 ohms, replace the relay.

Fault Code 7 - ABS Control Unit

ABS connector pins of interest	1,3,17
Test Value	resistance
Resistance	Open circuit to ground.

Measure between each of the pins and ground, it should indicate an open circuit. Pin 1 is the front wheel speed circuit and should be open to the speed sensor shell. Pin 3 is the rear wheel speed circuit and should be open to the speed sensor shell. Pin 17 is the ABS relay socket terminal 86 and should be a open circuit from it to ground. Also, from Pin 17 to ABS relay socket terminal 86, it should be a closed circuit.

If these indicate correct, the ABS brain is bad.

(In at least one instance the ABS faulted, indicating the ABS brain, but it would reset, and worked fine afterward. So, there might be some conditions that are intermittent and self curing. If so, knowing how to reset the brain and see if it has cured itself, may have saved you a BUNCH OF MONEY.)

Fault Code 8 - Outside influence
Speed sensor gap

This fault can be caused by low battery voltage, loose wheel speed sensor, or incorrect speed sensor gap.

The battery voltage has already been tested by now, testing sequentially. Grab them, and check that the sensors are secure. Check the speed sensor gaps. My front wheel sticker says 0.35-0.65 mm. However the Service manual and the owner's manual say that it should be 0.60-0.65 mm front, and rear. It is to be measured where the chisel punch point is on the speed sensor (toothed gear).

ABS Warning indicator is continuously on

ABS connector pins of interest	18,19
Test Value	resistance
Resistance 18-19	110 +/-20 ohms

If it is not correct, check from ABS connector pin 18 to the ABS warning relay terminal 86 and, check from ABS connector pin 19 to the ABS warning relay terminal 85. (The warning relay is in the electrical box, front right, just to the right of the wiring harness entry. The relay terminal orientation and numbering are different from the ABS relay.)

Socket:

```
        ____________
       |    ___     |30
       |    ___     |87a
       |            |
       |  |      |  |
   86  |  |      |  |85
       |____________|
```

The wiring should have virtually no resistance to the socket. The relay coil resistance between pins 86 and 85 should be 110 +/-20 ohms.

ABS connector pin of interest	5
Test Value	resistance
Resistance	Open circuit to ground.

Measure from ABS connector pin 5 to frame ground.

If it is an open circuit replace the brain. If an open circuit is not indicated, check pin 5 to the ABS switch. If wiring is good, replace the ABS switch.

I would like to thank Steve Burkholtz who in a message back on 16 Oct 1997 noticed that the center pin voltage varied. Using a VOM to determine the fault codes takes some skill, but is WAY CHEAPER than using the BMW tool, which I think is about US$1500!

Also to be thanked is Richard Paton <RICHARD@DYNAMO.COM.AU> who on 15 Oct 1997 gave instructions for resetting the ABS.

Thanks to Rob Scott who confirmed that you can see the pulsing with a digital voltmeter. (And who saved himself a trip to the dealer to find out what was wrong, and reset the ABS computer.)

Now, after correcting the problem, and resetting the fault code, take a ride and see that the ABS stays happy. The fault code memory only stores one fault code. So, if there are two problems, the fault code will have to be read again, and then the next problem identified and corrected.

Does this work? Yes, I tried it on my bike. I created a fault by disconnecting the rear wheel sensor. I did this with the power on, and the diagnostic indicator line immediately went into fault code number 4 indication. (Apparently they are active sensors and opens are detected.) The ABS did not work. I tried. I reconnected the rear wheel sensor, reset the ABS, and the ABS was working again.

Rob Scott had his ABS fault on the way to Missoula. Using this procedure, he found it was indicated to be the brain. But it reset fine, and is working now. (Or he has a battery or regulator going south.)

Go forth, investigate, test, and fix!!! Then you only have to spend the money to replace the expensive bits that have passed on, rather than for the mechanics time, and that expensive little BMW Diagnosis tool.

Reading ABS I Fault Codes

By: Frans Schrauwen
October 1999

Brian Curry wrote an extensive text on how to identify ABS I fault causes. He was able to see the pulses using an analog meter. An ABS Fault Code Test Box was later described by Andries van den Broek.

The fault codes can be made visible with no more than LED + resistor.

Use a low-current LED (think 2 mA) in series with a 1200 Ohm resistor between the centre number 2 pin of the diagnosis connector (under side panel, bike right hand side, plugged into blue 'blank' connector).

ABS Fault Code Test Box

By: Andries van den Broek

In the ABS faultcode text of Brian Curry was it not possible make the faultcode visible with a lamp only with a multimeter.

So I decide to make it easy to count the faultcode by using a LED. It is not expensive only a little of time for making this box.

Necessaries materials ABS faultcode read out LED:

- Small box
- Fuse holder and fuse
- 2 Resistors of 1 k-ohm
- 1 LED Red or the color you wanted, max Amp diode 20 mA, U-diode 1.6 - 2.7V
- 1 NPN Transistor BC 547 A
- 1 12 volt connector male like your BMW 12 Volt connector
- 3 Round 4 mm banana connectors female: 1 Red, 1 Blue, 1 Black, placing the banana connectors in the boxside

If you wanted to make it suitable for the Hall ignition time measurement K-Series, as describe in the Clymer book you need to have a switch On-Off.

For the circuit see here.

ABS I Sensor Removal

By Brian Curry
September 1998

How do you get the ABS sensors off?...

Well, I did it (at least on the front) tonight, and here is the info. The early bikes used Allen fasteners, the later ones used Torx fasteners. I have one of the later ones. The fasteners with their location and size are very prone to picking up road spooge that fills the recess.

The sensor is mounted via two Torx fasteners, to an adapter that is fastened to the caliper via another two Torx fasteners. One of the sensor mounting fasteners is visible. The other is buried behind the sensor, and under the head of the other adapter mounting Torx fastener. You may need to get a sharp pointed object in there to clean out the recesses first. You cannot use one of the "universal drivers" with interchangeable tips. (I had one by Mac.) The universal driver stems are too fat to get past upper adapter mounting fastener. What will work, are properly "sized" Torx drivers. The properly sized Torx driver stem will get past the adapter mounting fastener. I have one of these "universal sets of Torx drivers" that flip out from the end of the cover/handle. It worked quite well, since the stems were thin, and cover/ handle provided enough leverage.

Those fasteners are REAL TIGHT. The adapter mounting fasteners, are Red (Stud and Bearing, HIGH STRENGTH) thread locked in. (I think that the only type of Loctite that is imported into Germany, or bought by BMW, is the red High Strength stuff, that is nearly impossible to break free. Every time I find thread locker on a fastener on the K bikes, it is the red stuff. And it is a bear to break loose. Every time.) And the lower hidden adapter mounting fastener, is counter sunk, so that if there is ANY corrosion, it is really locked in there.

The ABS sensor is fastened by two T25 Torx fasteners. The ABS mounting adapter is fastened by two T30 Torx fasteners. The early ABS bikes used a 4 mm Allen for the mounting adapter, and I did not check the ABS mounting.

To see, clean out, and get to the fasteners, it is likely you will have to take off the brake calipers. I did. Both of them on the front so you can see the fasteners and get to them. Then the job is just a pain, and not a PITA.

So, now you know, and don't have to go on a discovery mission of your own. As far as ABS II I don't know. I don't have it on any of my bikes. Good luck if you ever have to take them off.

Activating the Choke Warning Light on Late K's

By: Jeremy Bell
March 1999

My 87 K75 had a Yellow choke (technically a Fast Idle) light in the bottom Left corner of the 4 warning lights in the Tach. My replacement 94 has the light, but it never activated. Always bothered me, as this was the only thing I gave-up when I traded-up...

Thanks to leads from Anton Largiader's Web site, I was able to get this feature back again.

Sometime between 87 and 94 BMW decided to remove the switch that operates the light, but keep the bulb and the wiring...

Needed part # 61 31 1 459 569 BHP Switch. Cost $20.18 US.

This is a microswitch in a threaded body, about 12" of wires ending in a 2-connector plug. Switch installs into a threaded hole on bracket that holds the Choke Linkage by Injectors.

To install:

- Remove Tank. See article in this section.
- Locate connector under tank. Marked 'Choke' on my 94. 2 yellow wires terminating in a plug
- Thread new switch into threaded hole at rear of Injector Linkage, LH side of bike. I had some trouble getting the threads to align.
- Connect to under-tank plug.
- Test, then reinstall tank.

Alternatively, if you want a neat built-in (and Bright) Warning Light, shorting the Connector under the tank activates the bulb. Built-in Stealth Radar Detector, anyone ???

Adding a Fan Indicator Light

By: Clarence Dold
March 1999

There is a yellow light on the tach face, alongside the red overtemp light, which was connected to a switch on the choke cable to illuminate when the choke was engaged, on early model K-bikes. Later the choke switch was removed, but the light is still in the instrument pod, and the cable is still in the harness.

I did some wire checking on my K75s. Under the front of the tank, on the left side of the frame, is a two wire cable labeled "choke". The connector is about 3/8" flat, with a brown and brown/violet wire. It is free (not plugged in to anything). I was able to access this area by sliding the tank back. I didn't have to remove the tank. First, short the two wires together with a jumper (I used a chunk of solder, folded into a "u"), and turn the ignition on. The yellow light should be illuminated. If not, perhaps the bulb has been removed, or you have the wrong wire. Pull the jumper, and the light should go out.

Locate the wire going to the fan. This is a heavier connector, 5/8" flat, with three positions, but only two wires, a brown, and a violet/yellow. From the right side, down low, I could see the route of the wire up from the fan to the area where I found the connector. Both of the connectors are in the same vicinity, making wiring easy.

The light is expecting a contact closure from the old switch, so I connected those two wires to the Normally Open pins of a Radio Shack "12VDC PC RELAY" 275-241.

I wired the relay coil in parallel with the fan motor, leaving the original fan power wiring intact.

I covered the relay completely with RTV silicone (it's only about 1/2" cube), and taped it, then laid it on top of the ignition module.

At an ambient temp of 40 degrees, I started the bike and let it idle for 10 minutes before the light came on. I couldn't hear the fan, due to running the engine at about 3000rpm in a carport. When I dropped the bike to a normal idle, I could hear the fan. At an idle, the fan shut off after a few seconds. Oddly, the light stayed on for another second or two after I heard the fan shut off.

Now I have a yellow light indicating fan activity.

I really wired the light just because it is there, but it is a good indicator of heating when you can't hear the fan, or as a clue that a fan has gone bad.

Early K Instruments - keepin' em dry and working

By: Don Eilenberger

Keepin' em Dry:

My '85 K100RT would fog the instruments if there was a cloud within about 100 miles when I got it. Since these instruments are known to have moisture related problems, I decided there must be a cure.

Hint Numba 1 - vent it. It isn't necessary to go the gore-tex route (although this would be nice). A single hole drilled in the back cover of the instrument cluster between the rows of pins will work fine, and be in a spot that doesn't get wet. Disassembly of the instrument is recommended so you don't drill into the guts.

Hint Numba 2 - seal it. This hint came to me from England - and if they don't have moisture I dunno who does. After you add the vent above, and reassemble the cluster - carefully replace the useless "O" ring in the groove between the halves (it isn't REALLY an "O" ring - it's a foam ring..). Then using HIGH QUALITY (3M can't be beat!) electrical tape - run a single layer of tape over the joint between the 2 halves. This will provide a very effective seal, and when mounted on the bike (especially on an RS or RT) is virtually impossible to find (and if you do it neatly - it looks like it belongs there).

Having done the above - my K has survived downpours, cold weather, hot weather, rides in the rain - and has never fogged up again.

Not a bit - really!

Cost - about $0.10 worth of electrical tape.

Early K instruments - keeping them or making 'em work again:

As other people have noted - the big problem with the early K instruments was moisture induced corrosion of the pins and sockets connecting the various electrical goobers (tech-term) inside the instrument pod. Problems can be fixed, or avoided.. it can easily be done while the instrument is apart for the hole drilling to let the moisture out...

The instruments plug into each other and the main circuit board mostly using square pin connectors into square sockets.. your job it to make these connections good electrically, and prevent future corrosion.

Remove each component of the cluster with care - they unscrew and unplug. Haynes manual shows the process of disassembly.

Clean the connections as other people have described. On badly corroded connections - a bit of scraping with the edge of a tiny screwdriver until some bright metal is seen will help.

Then - the trick stuff:

Trick numba 1 - VERY carefully - take a good quality small pair of pliers (I would use ones with a tip about 1/4" wide, and narrow ends), twist each square pin about 5 degrees (direction isn't important). Be very careful not to damage the plastic they are mounted in (using two pairs of pliers is even better, hold the bottom of the pin near it's mount and carefully twist the top just a tiny bit.

What you're doing here is adding pressure to the connection, and exposing 4 sharp edges of the pin to the inside wall of the sockets, improving the electrical conductivity of the connections.

Trick numba 2 - (and thanks to Brian Curry for this one!) find your metallic based antiseeze and a toothpick. Goosh (tech term again) some antiseeze out on a clean surface (not much - you're only gonna use a tiny amount, and it is messy stuff). Take the toothpick and pick up a tiny amount of the antiseeze. Push it into one of the square sockets. Do each one, with only a tiny bit of antiseeze.

What you're doing here is two things:

1. Filling the voids so oxygen can't get at the nice new connections you've made by doing hint numba 1. Some people have advocated using greases such as silicone - these are non-conductive, which isn't good...

2. You're increasing the conductivity - yep! The metallic based antiseeze is conductive. It's the metal in it. (Usually either copper or aluminum).

Reassemble as per Haynes, reinstall and enjoy working instruments... unless you have a '85 - in which case I'd suggest removing the fuel warning lamps (they don't work worth a damn when they are working) and installing a FuelPlus+ - which is when I did all of the above!

The bending of the pins may have been an official BMW repair technique.. my pod had been repaired when the bike was about a year old.. and it continued working even with the severe fogging I experienced with it. The antiseeze is the icing on the cake.. too bad motometer didn't do it at the factory and use something besides a swiss-cheese rubber ring to seal the things with!

Flaky Speedo Fix

From: Rob Lentini <roblentini@cox.net>
Date: Wed, 8 Mar 95 10:10:54 MST
Subject: BMW: Motometer Fix

Dan Eggert asked what can be done to fix Motometer speedometers on Ks:

Dan, I had numerous (I think 4 or 5) speedometer failures soon after I purchased my K75S new in '87. Nothing really fixed the problem until Iron Horse in Tucson replaced the entire instrument module under warranty. New modules are identifiable by two small Gore-Tex vents on their undersides.

Assuming you've got the older type and can't get it replaced for free, try the following:

Intermittent speedos are usually caused by a fault in the internal connector to the speedo subassembly. Remove the entire module from the bike and lay it on a towel, face down on your work bench. Remove all the perimeter phillips screws. Remove the module back cover being very careful to not damage the gasket. With the speedo to your right, you will notice a plastic arm with a printed circuit run that plugs into the speedo input connector. The speedo female-side contacts are usually the culprit. Corrosion can form between the male pin and female contacts, or the female contacts lose spring pressure on the male pin. What you've got to do is separate the connector, carefully bend the female contacts tight again, and reassemble with perhaps just a SLIGHT amount of copper anti-seize compound on the male pins to assure long- term continuity.

At this point it will be easy or hard on you. Early speedo connector arms had a service bulletin performed that actually called for sawing the arm in two, then cementing the connector to the speedo with RTV. If yours has had this done, you should be able to carefully pull the connector back and off the speedo to service the contacts. If the arm is unmodified, you will need further disassembly including removal of the instrument assembly from the bezel cover, and them removal of the speedo module itself--all this to get to the contacts! It can be done, requires patience and dexterity, but if you're intimidated by all this have your dealer do the procedure. Hell, he may get you a new cluster courtesy BMWNA just to avoid the hassle of working on yours!

The new Gore-Tex Motometer modules supposedly have improved contacts, and the speedo connection is screwed onto the rear of the speedo, eliminating (or at least greatly reducing) vibration-induced loosening the the connector. My new module has been very reliable. I've only been into it to replace a burned out bulb.

Good luck!

Rob Lentini
'87 K75S
Tucson, AZ

Date: Wed, 8 Mar 1995 15:15:41 -0500 (EST)
From: Charles Goodspeed IV <CGOODSPE@CAIS.CAIS.COM>
Subject: BMW: Re: BMW K75 Intermittent Speedometers

I have experienced all of the intermittent problems previously mentioned regarding the speedo on my

K75. I have taken it apart, cleaned everything, to no avail. I finally found that the little connector that is located under the right side cover, a 2 pin connector, was crudded up, thus the intermittent problem. I cleaned it and voila it worked, for a while. The next time it went intermittent, about 1 year later, I took apart the speedo unit, and noticed black corrosion between the 24 pins on the back of the unit, and the flexible copper circuit tape. The solution to this it to scrape away the corrosion, very carefully, and buy some rear window defrost fix-it paint from your local auto parts store, and paint each pin carefully. Let the paint dry, and then make sure the paint between adjacent pins is scraped away, or you may get a short. It this doesn't fix your problem, I would be very surprised.

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-----------------------------------------------------------------
Charles Goodspeed                            6300 Georgetown Pike
SAIC                                         McLean, VA 22101
703-285-2081
89' K100rs
86' Husky 510TE
72' R60/5
86' 535i
..........you were really flying when I passed you!
```

Early K-bike Fuel Light Fix

By Jim Solberg
September 2002

K-Tech Page Maintainer's Note: This will only work for early K-series bikes. Certainly those with the amber 7l light and the red 4l light, later ones up to the point where the analog sender was installed.

Purchase two 1 K OHM potentiometers from Radio Shack, #271-342, for $1.49 each. Splice one into the brown/white (4 liter) wire and the other one into the brown/black (7 liter) wire, where the wires go into the tank.

Measure 4 liters of fuel into an empty tank. Adjust the potentiometer for the red light so it comes on at the 4 liter content in the tank.

Obviously, the other potentiometer should be set so that the yellow light comes on at the 7 liter level. Of course, you could be creative and set them to come on at any level you desire.

Rather than empty the tank, I emptied almost all of it, then ran the bike until it ran out of gas, so I would have a true indication of liters remaining of useable capacity.

You can get as fancy or simple as you want with the installation. I mounted the pots in a small plastic box, with the adjustment screws accessible through two small holes drilled in the box. I also mounted a small switch through the box and wired it to be able to disconnect everything from the fuel lights just in case the fix didn't work. I spliced in enough wire to be able to mount the box to a frame member just behind the right side cover. I filled the box with silicone, completely covering the pots and switch, as protection from the elements and vibration.

This fix has worked flawlessly for sixteen years.

Fixing your K-Bike Speedo

A number of people have enquired as to how to cure the problem of the speedos on early K-bikes intermittently malfunctioning. Typically, a quick rap on the speedo housing brings the unit back to life, albeit for a rather limited time. There **is** a more permanent solution, however!

How it works:

The problem is this: The K-bikes have fully electronic speedometer units, a first for BMW (or any motorcycle manufacturer that I'm aware of). There is no cable involved, as we're used to seeing, but rather a sending unit, which sits back on the final drive, and an electronics package which drives the speedo needle proper.

The sending unit is a reluctance-style pickup, which uses a toothed wheel within the final drive to sense rotation of the wheel. The coil in the pickup has a measured open-circuit output voltage (into 1 M‡) of about +/- 0.5V.

The electronics package is inside the instrument cluster.

The problem:

This low voltage (and correspondingly low current - 0.5 V into 1 M‡ is 0.5 µA, which ain't much) is the real problem. If you look at how the speedo assembly goes together, you'll see that it's modular in nature. It's that "plug together" nature of the speedo which causes the failure that we've all grown to know and love.

You see, the problem comes about when the terminals in the connection between various parts of the speedo assembly begin to corrode. This happens because moisture can enter the housing, perhaps by being exposed to a hard rain, which then attacks the metal surfaces inside the housing (note that late K's have Gore-Tex(tm) vents to allow the water vapor to escape naturally).

Evantually, an oxide layer forms on these contacts. This essentially insulates the two elements of the contact from one another. Since the signal is low voltage, it doesn't take much resistance to reduce the speedo input to the point where it won't drive the rest of the circuit.

What to do:

So, to fix the problem, you need to do two things: 1) remove the corrosion; 2) prevent it from recurring.

Both these steps require disassembly of the speedo, so let's get right to it!

First, you need to remove the speedo from the bike. There are two 10 mm nuts holding the housing to the upper triple clamp and a phillips screw retaining the electrical connections to the back of the housing. Remove them in whatever order makes sense to you and carry the speedo housing over to your workbench.

There are four allen-head capscrews which hold the mounting plate to the cluster and (on my '85 K100RS) seven phillips screws which hold the rear cover in place. Remove all of these and take a look at the internals of the cluster.

You'll see a six screws, which hold the circuit boards, bulbs, speedo and tach, etc to the cluster housing. To remove the guts from the housing, first remove those screws. Then, *gently* pull outward on the odometer reset knob. You can then turn the cluster over and the guts will fall out in your hand (do try to catch it!).

> *Note: If you pull the odo reset out too far, the spring, retaining clip and washer will probably pop off. Just reassemble them in this order: washer, spring, retaining clip.*

Next, remove the small black, slotted screw as shown. This will allow you to separate the speedo from the rest of the cluster, and will expose the connector which is causing all the trouble!

Clean those pins thoroughly! Contact cleaner will remove some of the oxide layer. Use it on the sockets the pins fit into, as well. A cotton swab will allow you to wipe any residue off the pins theselves, while you'll just have to let the sockets air dry.

To prevent the problem from recurring, apply a thin layer of petroleum jelly or silicon grease to the pins before reassembling the unit.

As far as the rest of it is concerned, assembly is the reverse of disassembly!

More K-Bike Speedo Failure Diagnostics

By: Robert Bini
April 2003

It was my turn lately to have the speedo on my 1990 K75 pack up at 67000 miles. I followed the advice given previously on this site by scraping the connecting pins, twisting them slightly and reassembling with petroleum jelly, but to no avail.

However, the thought of the vast sums of money necessary to have BMW sort it out induced me to persevere and a bit of patience and the use of a resistance meter solved the problem.

Here is the procedure.

1) Check the sensor in the rear transmission and the continuity of the wiring between sensor and instrument panel:

a. Disconnect the plug that connects to the back of the instrument panel.
b. As you look at the two rows of female pins on the plug, connect a resistance meter between pins 2 and 3 starting from the bottom of the row on the left.
c. A reading of approximately 280 ohms will confirm that all is well.

Should there be no continuity, note that the wiring has also a connector situated next to the rear brake fluid reservoir.

2) Check continuity within the instrument panel

a. Open the instrument panel by undoing the 9 screws.
b. Lay the panel glass face down. The male connections to the above plug nearest to you.
c. The matching pins are now 2 and 3 from the bottom of the row of pins on the right. They are connected by the ribbon to the small oblong printed circuit board immediately to their right. This board is the speedo signal amplifier.
d. Note the connecting plug between the ribbon and this board, it has 4 contacts.
e. The first two contacts on the left of this plug are directly connected by the ribbon to pins 2 and 3.
f. Check for continuity by connecting the meter to the FEMALE contacts of the socket, just visible on the underside, which, feed the sensor signal to the amplifier chip on this board.

In my case there was no continuity between male and female contacts of the first terminal on the left. I was surprised at how much scraping, reconnecting and retesting was necessary before continuity was re-established, even though there was little evidence of oxidation.

A further connection can be traced from the fourth pin of this plug to pin 3 of the 3 pins plug right on top of the speedo itself. I take this to be the amplified output signal fed to the meter.

Clearly, the above procedure only checks the path of the un-amplified signal, but as this consists of a very small current, it is the most likely occurrence of a break in continuity.

A friend applied the official BMW service bulletin fix to solve the glowing telltale light problem on his K100RS. It worked like a champ. I plugged it into HTML in case you want to add it to your K bike home page.

-Gary Nelson

Fixing glowing telltale light on K models

Service bulletin 61 021 89 (2354), issue April 1989

Subject: Telltale light glows-K models

Condition:

Battery charge telltale light glows very dimly, even though engine RPMs are at highway speeds. This condition is most noticeable at night and when heated grips are used.

Information:

Testing the charging systems proves that the charging system is working properly and no fault can be found. The purpose of the charge indicator light is to inform the owner when alternator output voltage equals battery voltage. This is done by providing battery power (gn sw) to one side of the indicator light. The light grounds (bl) through the alternator diodes until alternator output equals battery output, thereby providing a positive on both sides of the bulb, which makes it go off.

Cause:

The light may glow (particularly with the heated grips activated) because some resistance has developed in the connections on the (gn sw) side of the circuit that slightly lowers the circuit voltage, so that a minor voltage difference occurs. Heated grips' consumption exacerbates this resistance sufficiently to produce a drop of perhaps 1/2 to 1 volt, which makes the light glow. This condition does not affect the output of the generator.

Remedy:

Although the system will work perfectly without any change, it may be annoying to the rider. The simplest way to correct this condition is to install a diode in the blue wire. This will eliminate any backfeed if the voltage drops slightly on the system side (gn sw) of the circuit.

Installation of Diode:

Diode--part no. 61 31 1 358 268--can be installed near the alternator. Cut the blue wire approximately 2 inches from the plug-in connection at the alternator and splice in the diode. The diode and splice connections must be protected from elements with heat-shrink tubing or electrical tape. OR The diode can be spliced into the blue wire inside the electrical equipment box under the rear of the fuel tank.

Direction of Diode:

The arrow on the diode must face towards the alternator.

K Bike Speedo Adjustment

By: Brian Curry
November 1996

Rob Lentini and I have been having a discussion on the "adjustability" of K bike speedo's with Rob not being able to find the adjustment potentiometer. I found it and this describes it.

The adjustment pot is on the side away from the stepper coil. It is towards the lights and unless you have separated the speedo from the rest, you will not see it. It is behind the gears that drive the odo, and on the little board that you can see in the unassembled view. This is the board that the 3 pin connector plugs into. This is a high (12V) signal. I think some of it is robbed to drive the electronics for the frequency sensitive circuit that drives the meter that functions as a speedo indicator. Even then it is well buried with the adjustment almost exactly in line with the plastic sheet. This is just like the tach where they obviously don't want you to get your fingers in there.

Now, how to drive it and adjust it. That is for a later time.

But for those who are adventuresome and have time on your hands, you too can adjust your odo.

Brian Curry, Chester Springs, PA, USA

Speedo Adjust Pot Details

By Geoff Adams
June 2001

The speedometer on my '85 K100RS read about 10% fast at any given speed. It can be adjusted by turning a potentiometer within the speedometer itself.

The pot is the small metal part in the photo just above the yellow plastic gear. Use a miniature screwdriver in the rectangular slot.

An approximate 90 degree turn to the right (clockwise) doubled the error to about 20% high. A turn to the left of about 40-45 degrees (as far as it would go in this case) seems to have exactly corrected the speedometer reading. (A normal K100RS [2.81 final gear] characteristic is that when in 5th gear, both the speedo and tach needles remain exactly parallel to each other at all speeds.)

The pot is accessible only after separating the speedo from the instrument assembly. There is a single small black screw on the back of the speedo that attaches it to a plastic arm reaching from the center carrier. Remove that screw and the speedo can be moved forward to access the pot. When the instruments are out of the housing, a lot of very fragile pieces are exposed, so handle with care.

Photo courtesy of Brian Curry.

Wobbly K Instruments - Fix

From: Don Eilenberger
November 1996

It all went back together very easily, but now, the slightest jarring of the bike (while riding) causes a wiggle somewhere between the mambo and the macarena.

This is my first K75 so I just want to know -- Is this normal?

Yup. That's how mine was also on the K100RT - and it was so distracting I took two steps to dampen it a bit:

1. My usual self-adhesive foam tape between the instrument pod and the mounting plate.. a bit at top and a bit at the bottom, mebbe 1/2" wide x 3" long each.

2. An external high-compressibility, low vibration transmitting damper assembly.. consisting of a piece of foam rubber about 1/2" think, 3" long, 3/4" wide under the front edge of the pod between it and the switch gear pad.. it went in real nicely and stays where I put it 'cause it was an extra that came with some helmet I bought, where you were supposed to velcro[tm] it in place. Well, I did - I velcro'd it to the bottom of the pod.

These two steps cured the wiggle. As you know - it can be very distracting.

Don Eilenberger
Spring Lk Hts, NJ, USA

LCD Clock Repair

By: Bob Wilson
April 2003

Should the digital clock on your BMW K100 begin to suffer from missing digital segments, there is a good possibility that you don't have to get ripped off to the tune of $200 to buy a new one (especially painful since there is less than $5.00 worth of components in the thing!). Here is the procedure to try before your BMW parts man relieves you of your wallet.

Requirements:

1. Some skill in soldering Printed Circuit boards.
2. A fine tip, 40 to 60 Watt soldering iron (e.g. Weller W60 temperature controlled type).
3. A little resin core "electronic" solder (60-40, or 63-37 alloy), with a solder-wire diameter of 0.032" max (the very fine 0.015" diameter stuff is even better).
4. A 5mm "Allen" wrench (AKA "Inbus", if you are German), and a #2 phillips screwdriver.
5. A little silicone grease (Dow Corning #4), or as a second choice, some vaseline petroleum jelly.
6. Some "solder wick" to remove excess solder.

Procedure:

Remove the 4 Allen bolts from the back of the instrument nacelle. Remove the connector cover from the rear (once the unit is free from its mounting). It is held in place with a single phillips screw. If your bike has a fairing, you will probably need a stubby phillips to get in there, since the cables leave little free length. Once the cover is removed, unplug the 2 connectors, taking note of which is right, and which is left (they are otherwise identical).

With the nacelle on the bench, remove the multiple small phillips screws from the rear of the unit. Do not remove the 2 larger countersunk screws near the center area of the back. Pull the back off the nacelle.

Inside, you will find 4 or 6 phillips screws that hold the "guts" into the front part of the nacelle. Remove them, then remove the internal assembly from the front housing in one piece. Be sure to pull the trip odometer reset knob out sideways against its spring as far as you can, to allow the internal assembly to be pulled out.

The Speedo and the Tach assemblies must now be separated from the main internal assembly. They are held in with a few small slot-head screws, and you have to unplug a few strips of flexible interconnect cable.

Now the square bezel around the clock module can be pulled upward and off, and the clock module can be pulled free together with its clear acrylic mount.

Fixing the clock:

There are two common reasons for missing segments (actual electronic component failure is not very common). One is that the circuit-board-to-LCD connection is faulty (oxidized), and the other is that one or more of the the multiple pins of the clock driver IC has a bad solder joint.

Remove the clock circuit board from the acrylic housing by flexing the mounting "lances" back to release the board. Be careful not to lose the two "Zebra Strip" connectors when the board is pulled out. These are small, rubbery strips that have near-microscopic stripes of colour on them. They fit into two slots in the acrylic housing, and connect the circuit board to the glass LCD. Once installed, they are compressed between the LCD's glass contacts and "pads" on the board.

Pull the LCD out the side. NOTE THE ORIENTATION! There is a very small "bump" of clear silicone on one end. When reassembled, this end goes in first, with the thicker of the two bonded glass plates of the LCD facing AWAY from the circuit board.

Inspect the circuit board carefully (use of a magnifier is recommended). DO NOT stick a screwdriver into the variable capacitor (on the board) and try turning it! This is the accuracy adjustment for the clock's crystal oscillator. Using some fine ScotchBrite (NOT SANDPAPER!!), lightly AND CAREFULLY buff the 2 rows of pads on the back of the board (that the Zebra Strips rest against). An oxide layer here can cause the missing segment problem.

Next, resolder any obviously bad solder connections. In particular, the clock IC leads are just surface mounted (they only are soldered to pads on the surface of the board), and thus the solder connection can easily crack. Resolder each lead by applying a small amount of solder, and "wipe" the soldering iron down the lead, away from the side if the IC, and onto the pad. If you create a big blob of solder in the process, don't panic! Just use the solder wick (placed between the blob and the iron) to suck up the excess, and try again. The trick is to use a clean iron (wipe the tip over a wet sponge just before each use), and use VERY LITTLE solder. A correctly soldered lead will have a small shiny fillet of solder at the end of the lead and smoothly joining to the pad.

Carefully inspect your handiwork and reassemble everything. Two more points, though. First, you can try out the clock before assembly by connecting a 6V battery (any size) to the two tall rectangular pin sockets on the board. Be SURE to connect the (+) wire from the battery to the socket marked (+), and (-) battery wire to the socket marked (-)! DO NOT REVERSE POLARITY OR YOUR CLOCK IS TOAST! Do not use a 12V battery!

Second, when you are ready to put the back on the nacelle again, take the O-Ring that seals the back and grease it with a thin film of silicone grease (or vaseline, if that's all you have). DO NOT USE LUBRICATING GREASE!. Pull the O-Ring through your fingers to distribute the grease evenly. Ensure the mating plastic halves are clean, install the O-Ring onto the lip on the rear cover, and assemble the thing.

One other thing. Be sure NOT to allow any oil or grease to contact the GoreTex breather discs in the rear cover. These things allow air to vent in and out, but block water. If oil or grease contacts the material, it is no longer hydrophobic, and will not block water entry. If you are unlucky enough to get the GoreTex contaminated, wash the entire back cover with a strong detergent to remove the contamination, then rinse thoroughly with clean water. Goretex is just porous teflon, and will completely withstand anything you can throw at it.

Dealing with Moisture in your Instrument Cluster

By: Tom Childers
August 1995

When it rains or gets wet or damp (humid), the instrument cluster fogs up. Again, FYI, this is a 1987 K100RT. I was told this (the fogging) isn't good, and that I need to buy a little O-ring (gasket) to seal the cluster before I ruin the whole cluster (lots of $$$). Is this true? And if so, how do you get the cluster off? I looked for screws, and didn't see any. I think I might be brave enough to do this myself, if I know for sure what I need to do.

This is pretty normal behavior. The cluster has two teflon (?) air vents on the back that allow moisture to escape. My KRS cluster will occasionally fog up a bit in the winter, but dries right out as soon as the sun hits it.

You may want to replace the o-ring, just in case. To remove the cluster:

Remove the pad with the ignition and auxiliary switches. There are two allen bolts underneath that bolt it onto the triple clamp.

Next, look down at the cluster from above, look down the lower side towards the triple clamp. You will see a 6"-long metal bracket with two bolt heads, in between the cluster and your handlebars. Now, look at the underside of the cluster, next to the triple clamp, and you will see two nuts that are screwed on to the bolts in the metal bracket. If you remove the two nuts (10 mm?) on the bottom, you can grab the bracket from above with pliers and pull it out.

The instrument cluster will now pull off of its mountings toward the front of the bike.

Lastly, you need to remove the wiring harness. It is held on by one small allen nut that goes into the cluster through the middle of the plug block on the end of the harness.

Once the cluster is off, you remove the four allen bolts that hold the mounting bracket on, then remove the 12-or-so screws that hold the back of the case on.

BY THE WAY, I recently pulled my cluster apart to replace bulbs, and I changed the illumination color from green to red! All you need to do is pull the green plastic sheaths off of the bulbs, then paint the bulbs red with fingernail polish! Choose a deep red color; the cheaper lacquer-based polish works great.

You also have to pull the fuel level and water temperature gauges from the fairing, and paint the illumination bulbs in those housings as well.

Red instrument lights! Much better than the green lights!!!

-tdc

Tom Childers
'89 K100RS
'79 R100S

More Comments on Speedo Problems/Fixes

Date: 9 Aug 1995 09:24:48 UTC
From: "Diaz Jon" <DIAZ_JON@MACMAIL1.SWINDON.RTSG.MOT.COM>
Subject: BMW: K75 Speedo Problems

Jim Colburn enters the world 'o K:

>The speedometer on the 1986 K75C that I just got has stopped working. The
>previous owner says "just tap it/honk the horn/wait a while" and it'll start
>working again. Is there a cheapish way to fix it? I see from Capital Cycle's
>catalog that they only stock the whole instrument cluster at $625..... is
>the speedo available separately? I tried calling speedo-fixer Irv Simon and
>he says he can't repair it.

Something I recently learned about the speedo is that it may be the pickup cable from the final drive to the head unit. When it craps out, try wiggling the wire down on the swingarm and see if anything comes of it. My speedo has shut itself off for about 40 miles on two different occasions this summer (both stinky hot days, FWIW), but since the last hiccup it has been fine for about 1200 miles. Weird.

If the turn signal stays on forever, then it is likely this cable. If it turns off, then the unit is still reading distance and you have the pin problem inside the speedo assy.

Just another thing to check......and this wire goes for $52 (dealer invoice $35 or so :)). I checked.

jon diaz

From: hawley@aries.scs.uiuc.edu (Chuck Hawley)
Subject: Re: BMW: K75 Speedo Problems
Date: Wed, 9 Aug 1995 13:27:43 -0500 (CDT)

I found the intermittent contacts to be where the speedo plugs into the printed circuit board inside the housing. Just moving the unit around seems to clean the contacts for awhile. I installed a small 3 pin plug and socket on both of our '86 K100's, and they seem to be cured. I introduced a problem on one of them in that when I soldered to the signal input on the circuit board on the speedo, the trace connected to it became unconnected. This caused the symptom where the speed needle goes full scale and wanders around in general. So I found that eventually and fixed it. Incidentally, the input to the speedo pins are signal, gnd, and +12 looking at the back of the speedo unit. The signal comes from the small circuit board strip attached to the back of the speedo (on the later units it's attached to the main circuit board, but is still in the same location). The signal that this board puts out is a 0 to 6 volt square wave, and is sent to the speedo unit signal input pin (it also goes to the turn signal unit via the main housing connector). The input to the amplifier strip is the pickup unit on the bevel gear housing. I found that a 90 Hertz square wave gives about 80 MPH. You could figure this out by counting pickup pulses for a wheel rotation...etc.

Does anyone know what the chip on the speedo PC board is? It is a stepping motor driver for the odometer, and puts out a current proportional to freq. for the meter (speedometer). I have never known one to go out, but it would be good to have a spare chip. The amplifier chip is an LM2904. This one sounds available.

I wish I had a few of the jillions of K instrument units that were thrown out. I feel that we could make all of them work. Oh. Also I fixed the trip odometer. Two of the wheels would not reset. They needed to have a couple of nibs glued back in place inside the wheels. It's tiny but able to be done.

Charles Jack Hawley Jr.
Amateur Radio KE9UW (A.K.A. 'Chuck' in Ham Radio)
BMW K100RS BMWMOA #224 (A.K.A. 'Jack' in Motorcycles)
hawley@aries.scs.uiuc.edu
Sr. Research Engineer Emeritus
Univ of Ill, Urbana-Champaign

Date: Wed, 9 Aug 1995 15:22:45 -0400
From: Rob Lentini <roblentini@cox.net>

Ah, the Motometer shuffle, again.

You probably don't have the updated instrument pod, identifiable by two Gore-Tex vents on the back cover (and internal electrical improvements).

Do the easy stuff first:

1. Remove, clean, and reinstall the speedo inductive transmitter located on the top of the final drive. Be careful not to let dirt enter into the open hole.
2. Remove the right battery cover and black plastic alternator cover. Separate, clean, lubricate, and reconnect the two-wire connector coming forward from the inductive transmitter. Use silicon grease to lube.
3. Separate, clean, lubricate (again with silicone) the two strip connectors on the back of the instrument pod.

If you're lucky, the speedo will work. If not, options:

1. Take the bike to a dealer. They may update the old-style pod with the "new/improved" version (and it really is, BTW).
2. Let them attempt to fix what must then be a failed speedo module inside or, more likely, an internal connection problem at a strip connector on the back of the speedo module.
3. Or, YOU open up the back of the pod and repair the (probable) bad connection on the back of the speedo. Delicate work, my friend, so be REAL careful. The haynes manual shows the basics of back panel disassembly and bulb replacement--that's all. If you're careful, patient, and not a klutz, you have little to lose at this point.

Don't give the bike back! This problem is fixable and not expensive. Good luck.

Rob Lentini
'87 K75S
Tucson, AZ
K Whiner MC#11

Date: Wed, 30 Aug 95 10:47:43 EDT
Subject: K-Bike Speedo Problems
Reply-To: yeagert@usafe14.ramstein.af.mil

I have an '88 K75S. The speedo has failed 3 times. First two replacements were done under warranty at dealers stateside. The third Lone Star BMW sent me a unit to replace myself. Did so, same problem. Turned out that the sensor ring in the final drive had come loose. Fix is to take the final drive apart, epoxy the ring back in place, put back together.

Tom Yeager, AKA Rainman

K-Bike Speedo Calibrator

By Jack Hawley
April 1998

Last summer I built a speedo calibrator which puts out very accurate rates of pulses per second to simulate the pulses normally supplied by the rear wheel pickup. I have been using it and have drawn up a finished schematic which I will send to anyone who wants it.

Originally, I measured the distance the rear wheel travels, etc. to determine how many pulses per second causes the speedometer to register a mile an hour. I think I was within about 1 MPH at 75 MPH.

Not bad, but David Weiszbrod of Fuel Plus fame, supplied the fact that 75 pulses are input to the odometer to make it register 1 mile.

Bill Heckel supplied me with a data sheet for the chip inside the speedo and I determined from the schematic I drew of the circuit inside the speedo, that the chip divided the pulses from the rear wheel by 64. Working backwards then 64 X 75 pulses/mile = 4800 pulses/mile from the rear wheel. Then 4800 pulses/mile X 1 hour/3600 seconds = 1.333 pulses/sec for each MPH the speedo displays.

My box puts out 33.3, 50, 100, and 166.6 pulses per second as well as some other not useful rates (accurate to +/- 5 parts per million!). This corresponds to 25, 37.5, 75, and 125 MPH. I wired mine to put out 37.5 and 75 MPH selected by a momentary toggle switch which also applies the power from an internal 9 volt battery.

You can get the Epson 8651B osc/divider chip to build it from Digi-Key, 1-800-344-4539, for about $20 plus shipping. The rest of the parts can be gotten from Radio Shack.

K-Bike Speedo Calibration

By: Frans Schrauwen
October 1999

Early this summer the speedo of my '88 K100RS developed intermittent malfunctioning. Moisture is often visible in my speedo, though it has the Gore-Tex® vents at the back. I disassembled the unit (as described by Tom Coradeschi) and cleaned the contacts where the speedo plugs into the printed circuit board. This worked.

I used the opportunity to calibrate the speedo/odometer. The trick I used is based on the initial idea of Jack Hawley.

Needed: tools to remove and open speedo unit, elec. soldering iron.

1. Measure the distance of several rev of the rear wheel to find the rolling distance. I loaded the bike with my own weight and found 2.03 m/rev (6.66 ft/rev).
2. Connect an electric soldering iron to the mains (230 V AC & 50 Hz in Europe).
3. Switch on ignition.
4. Hold the soldering iron close to the rear drive speedo pick up (don't touch!). 1 cm or 1/2 inch should be sufficient.
5. See the miracle happen. My speedo indicated rocksteady 67 km/h (41.6 MPH). The rear drive sensor picks up the oscillating magnetic field of the soldering iron heating coil. It also works with a small household transformer or relay coil.
6. The speedometer rotor in the rear drive has 6 teeth. With 50 Hz AC line frequency and 2.03 m rolling distance of the rear wheel this would give 60.9 km/h (37.8 MPH). My speedo did indicate almost 10 % too high!
7. With the 50 Hz signal feed to the speedo pick-up, I measured the time to cover 1 km (0.621 mi) on the odometer. This was 59.4 sec, which corresponds to 60.6 km/h (37.7 MPH). The odometer is surprisingly accurate!
8. I calibrated my speedo at approx. 120 km/h, the max speed on Dutch highways. Doubling of the effective frequency can be done by feeding the mains to the soldering iron or coil via a bridge rectifier. Actual calibration by turning the adjustment potentiometer as described by Brian Curry.
9. The trick of wireless feeding the mains frequency into the speedo pick up is by far the simplest method to check all components in the line: pick up, wiring, connectors and speedo.

Speedometer Calibration Tools and Techniques

By: Jerry Skene
November 2000

The speedometer pickup on BMW's K&R bikes senses a magnetic signal generated by a rotating vane in the rear wheel assembly. It is possible to generate your own, calibrated magnetic signal, and so determine and adjust the accuracy of your speedometer.

The method is quite simple, as described below.

Have your computer play a sine wave sound file of a specific frequency from the table below, send this signal through a power amplifier, and in place of a loudspeaker, connect an electromagnet ñ a coil of wire wrapped around a steel bolt. I used about 200 turns of enameled magnet wire (Radio shack sells this stuff ñ part #278-1345) wrapped around a steel bolt. A variable speed electric drill is helpful in making this magnet. You can use an old horn or headlight relay here also, but it is only good up to about 45 mph.

Note: be sure to use at least 200 turns of wire, unless your amplifier can tolerate a very low speaker impedance. The author takes no responsibility for damage that may occur to your amplifier. Use the lowest volume control setting that gives a reliable activation of the speedometer.

If you have a laptop and portable amplifier, of course you can cart all this stuff out to your bike. If you have a desktop PC and a non-portable power amp, then you can connect your power amp to the electromagnet through a long extension cord, running out to the garage.

Place the electromagnet (I call it the transducer component of the precision computerized velocity measurement calibration system) next to the magnetic speedometer pickup on your rear wheel hub. When you turn on your ignition, your speedometer will now read a speed close to the speed from the table below. If the speed is off by much (mine was about 10% too high), you can adjust the speedo as described below.

An extremely simple alternative is to place a tape demagnetizer next to the speed sensor. This should read out 45 mph if you are using 60 Hz current, 37.5 mph if you are using 50 Hz current

Table of speed vs. frequency, for K1100RS (other models may require different frequencies)

Speed, MPH	Frequency, Hz
10	13.33
20	26.67
30	40.00
40	53.33
45	60.00
50	66.67
55	73.33
60	80.00
70	93.33

80	106.67
90	120.00
100	133.33
110	146.67
120	160.00
140	186.67
150	200.00

Sound files for 55 and 100 mph are available at: http://skene.org/kspeedo/ These are .wav files, 20 seconds long, and can be played through most audio playback programs, including Microsoft's Windows Media Player that comes with Windows. You may want to select the option "Repeat Forever" to have this file played continuously.

You can generate your own sound files using any one of a number of audio programs available on the Web.

To adjust the speedo, proceed as follows:
(also described, with some excellent photos, at: http://skylands.ibmwr.org/tom/tech/speedo/speedo.html)

- Remove four 4 mm Allen head cap screws with washers on the underside of the instrument housing. Be careful that these do not fall into the fairing when you pull off the instrument cluster.
- Pull the instrument cluster up and away from the handlebar assembly. This will expose the connector on the rear of the housing. Remove this connector by undoing the small Allen head bolt holding the connector on. The instrument cluster will now come free of the bike.
- Remove all Phillips head screws from around the periphery of the underside of the housing
- Pull off the rear plate of the housing
- Pull off the trip odometer reset knob. Be careful not to lose the small o-ring on the shaft.
- Remove the Phillips head screws (6, I think) around the periphery of the now exposed interior of the instrument cluster.
- Carefully remove the instruments from the housing. It may be necessary to gently pry the instruments out, using a small flat-bladed screw driver, working your way around the edge of the unit.
- Remove the single, small, black, slot-head screw next to the silver metal bracket on the speedo side of the cluster. Photo here: http://skylands.ibmwr.org/tom/tech/speedo/speedo5.gif courtesy of Tom Coradeschi . This will allow the speedo subassembly to be lifted up enough to expose the adjustment screw.
- Reconnect the instrument connector to the now disassembled instrument cluster, and let the unit rest on the handlebars.
- Turn on the ignition
- Energize the calibration transducer as described above
- Lift up the speedometer to expose the adjustment trimming potentiometer on the inside (right side) edge of the printed circuit board on the speedo subassembly.
- Using a small slot screw driver, adjust the trim pot so the speedometer reads the correct speed for the frequency you are feeding to the electromagnet
- Reassemble everything

Happy cycling!

Jerry Skene - jerry@skene.org

Diagnose Temperature Gauge Problems

By: Walt Briden
April 2003

All at once my temperature gauge on my '95 K1100RS would read one quarter scale for normal operating temperature instead of the usual one half scale.

Running in heavy traffic until the fan came on would not raise the needle above one quarter scale.ÝWas the gauge stuck or was the sending unit defective?

Bob Carter explains that the sending unit resistance decreases as the temperature rises, which mine did, but it would not go below 95 ohms. This can be measured by pulling the black wire off the sending unit at the coolant drain location and measuring the resistance from the middle of the sending unit to the engineÝblock.

What is the normal reading? Is 95 ohms normal? No! Brian Curry was nice enough to help me out here by warming up his K75 to mid scale on his bike and reporting to me itÝread 40 ohms.

Still not ready to pay about $65 for the sensor (come to find out the $65 sensor is the one with a short wire that controls the fan and the telltale, she's ready to blow, lamp. The sensor at the drainÝlocation is about $22), I rigged a variable resister I had between the black sensor wire and the engine block with two of the three binding posts on the resister soÝclockwise rotation would reduce the resistance from 100 ohms to zero ohms.

I turned on the ignition and the meter went to one quarter scale because 100 ohms was about the same as the defective sensor was reading when warm.

I then did what I thought Homer Simpson would do. I cranked the knob clockwise andÝcounterclockwise over and over while saying "the needle goes up, the needle goes down" with each movement.

Replaced sensor. All back to normal.

I am happy to report that the sensor can be changed without losing more than one half a teaspoon of coolant. Either have a new washer or have someone at the ready to transfer the old washer while you hold your finger in the dike."ÝÝ

K100RS Temp Gage Replacement

By Bob Carter
January 2001

Here are my notes on my search for an after market temperature gage to replace the failed OEM unit on my '89 K100RS. (I couldn't bring myself to pay dealer prices for a commodity item.) I've received several inquires on this topic since it was posted and have tried to address those questions in this revision.

Background and Technical Information

I purchased a VDO Vision temp gage #11-310105 (250 degree F) and a package of 1/4 inch female spade connectors at my local performance auto center. Great face-to-face service, warehouse stock, next day delivery AND returnable if I didn't fry it! The bill came to just under $40.

The OEM and this VDO unit are 2 and 1/16 inches in diameter (52 mm -- Note over the winter I measured the mounting holes in my brother's R100/7 S fairing and they are also this size). I chose the Vision series because of its integrated mounting hardware -- a spin on mounting cup. This eliminated any worries about matching it up with the OEM mounting cup. I also noted in a recent trip to my local NAPA dealer that some of the other models of the VDO gages (other than Vision series which has this spin on mounting cup) may be an exact match to the BMW and fit into the OEM mounting hardware.

For those interested, a good picture of this gage can be found at either of the following manufacturer's web sites:

VDO North America
VehicleControls.com

You'll also find technical information on this manufacturer's other gages and sending units.

The temperature sending unit is a thermistor -- meaning that the resistance changes as temperature changes. For those who want to know more about how this works to indicate temperature, the below link has some basic thermistor characteristics and circuit information:

Thermistor.com

As engine temperature changes the current/voltage signal to the gage also changes -- making the temp gage nothing more than a somewhat calibrated amp/volt meter.

Troubleshooting

There are two, independent cooling system temperature sending units - one for the gage and the second for the engine management system. Plus, there is an oil pressure sending unit.

The gage sending unit is located in the lower body of the water/oil pump housing. The combined water/oil pump is located on the front of the engine block. If you pull the lower fairing and take a close look at the housing, you'll find two sending units. The upper, aft sending unit is for oil pressure. The lower, forward sending unit is for water temperature to the gage. The water temp sending unit takes the place of the cooling system drain plug.

The engine management temperature sending unit is on top of the engine block, left side, just inboard and forward of the intake manifolds. This sending unit is mounted in the cooling system pipe. This temperature sending unit provides an input to the fan relay under the tank. If the radiator fan is coming on and cycling normally when the engine reaches normal operating temperatures, then this sending unit and its relay are working properly.

If your gage is not working properly, then you could have any or all of three potential problems: 1) a bad sending unit, 2) a faulty gage or 3) faulty wiring leading to the gage.

You can pull the gage from the dash (but leave it connected into the wiring harness), and starting with a cold engine, measure the voltage delivered to the gage. Use a voltmeter to measure the voltage, the voltage should slowly increase as the engine warms up. This will confirm a faulty gage. Below you'll find the wiring scheme as found on my '89 K100RS, which I assume is pretty standard. The gage reading "zero" is a normal failure mode -- no amount of input signal to it is going to get it moving. Mine exhibited intermittent functioning for a few weeks before total failure -- I could ride down the road and tap the gage and it would function for a moments, before falling bask to zero.

Having just rebuilt my water/oil pump, I can say with certainty that on an '89 K100RS, the sending unit fills the normal drain plug hole at the bottom of the water pump casing -- it would not be difficult to pull the sending unit and replace with a matching VDO unit, if you needed to. If you suspect the sending unit, one way to test it would be to pull it from the water pump casing (at the front of the engine), connect it to a ohm meter and place in hot water, observing its response. But before you do this, check the connections and the wiring.

Gage Replacement

I pulled the OEM unit from the fairing and with my trusty old VTVM found the 4-wire connector was set up as follows: Color Function gray/black lamp hot lead + 12 volts black sending unit signal brown ground green/black gage power +12 volts

I clipped the wires at the OEM gage and crimped on the female spade connectors (this preserved the OEM connector in case a follow on owner ever wanted to reinstall an OEM gage). The VDO gage is a five lead unit -- two ground connections -- one for both the lamp and gage, so I twisted in an extra piece of wire before I crimped connector on the brown ground lead, and hooked this jumper to the ground lead of the lamp.

The VDO gage comes with green and red lamp covers. I pulled the lamp and fitted it with the green cover to match the rest of the instrumentation.

I hooked up the VDO gage to the leads as per the instructions with that came with the unit -- they were pretty clear and straight forward, then clipped the harness into the bike and tested it. Worked fine. Fan cycled normally and came on at an indicated temperature of about 200 F, which is about right if I recall correctly.

The VDO unit comes with its own spin on mounting unit. I installed the VDO gage into the faring mounting hole. It was a perfect fit. Both the OEM and this VDO unit are 2 and 1/16 inches in diameter (52 mm).

I installed the O-ring under the gage that was used with the OEM, but not sure if I'll leave it there. The O-ring is showing its age, and I'm not sure it really does anything. Any thoughts on this?

Please note, I did not replace the any of the sending units. The coolant temp gage OEM sending unit was not touched.

The lighting of the VDO gage is excellent and appears better than the OEM fuel gage on the left side of the fairing.

Bob Carter
1989 K100RS ABS

K-Bike Tachometer Fix

By: Mark Camrud

I'll start this tech tip with a caveat. I'm not an instrument technician, and there are probably more elegant solutions to K bike tach problems, but this is what worked for me.

Two hours should be plenty of time to remove, repair, and replace the instrument cluster if no unusual problems are encountered. I have had experience with two types of K instrument clusters, which for convenience I call Early and Late. I'm not sure of the date that the Late cluster was put in production, but it can be easily identified by a pair of circular vents on the backside that the Early cluster lacks.

My '86 K75 has had the usual intermittent speedometer problems since new and I learned to live with it, but then the tach began to hang up in the 2K to 5K range.

Exploded layout of the early type instrument cluster.

I was assured by a BMW dealer that the replacement instrument clusters were new and improved, so I bit the bullet and purchased a new one in February of '94. The speedometer problem was solved, but about June of '95 the new tach began acting just like the old one. I complained to the vendor that I bought it from, and was told that Ïsorry the warranty was only good for 12 months, and I was now four months beyond the expiration date.Ó

Fine-$543.28 for a new instrument cluster and it acts just like the old one I scrapped. Figuring there was nothing to lose, I did a post mortem on the old cluster to see what could be learned. It turns out that the face of the tach board isn't supported on the upper left corner and after prolonged exposure to the sun (of which we have plenty of in New Mexico), it will warp up and bind the base of the tach needle.

Removing the instrument panel from the bike is a fairly straight-forward procedure, and there is a relatively extensive set of instructions on how to do it in the thick ClymerÌs K bike guide/ manual.

Once the cluster is sitting on your work bench begin by removing the tripmeter reset knob. Pull straight out on the odometer knob until it comes off in your hand. If you have the Early-type, just pull off a circlip and the end of the knob as seen in Photo #1. If you have a Late-type the reset knob with black bushing will come out as a unit.

Photo #1: Early type tripmeter knob.

Remove 9 long screws from the perimeter of the back cover, but do not remove the 2 flat-head screws that are under the tape in the center. Gently remove the back cover by pulling straight up, being careful not to damage the rubber gasket.

Take out 6 short screws holding the instrument board to the front cover and work the board out of the housing. ***Do not lose the circlip, a spring, and a flat washer that will be floating around loose inside on the Early-type clusters.***

Photo #2: The arrow points to the warped instrument face.

When the instrument board is removed look for any warpage as seen in Photo #2. My fix was to glue two 1/4" thick pieces of dense rubber inside the upper left corner of the tach where the tach face will contact it (Photo #3) and push it back into position. This resolved the problem with my Early-type tach.

Photo #3: Shows rubber blocks used to press face back into position.

The Late-type tach had a similar, but different, problem in that the tachometer board was flat, but the tach face is printed on an applique that had warped up and was contacting the tach needle. I glued the applique back down to the board with some 3M weatherstrip adhesive.

Before reassembling the Early-type instrument cluster, pop out the bushing where the odometer reset knob goes through the case. Assemble the reset knob with the bushing, the flat washer, the spring, and then the circlip. Replace the board in the front cover making sure it is fully seated and screw into place. Pop the odometer reset knob in the case after making sure the stem of the odometer is lined up with the slot in the knob. Replace the back cover, being careful not to bend the pins that protrude through it, and don't forget the cover gasket. Install the panel on your scoot and it's time for a test ride.

Transmission Gear Position Switch Troubleshooting

By: Brian Curry
March 1999

A number of people have reported their transmission gear position indicator (TGPI) getting goofy after running in the rain or washing their bike. They report that it gets better if the bike has some "drying" time. It sounds like water is getting into the switch and when it drys out, it works OK. If this is true, it could be bad long term, because the corrosion can eventually inop the switch or get the sensing module totally confused. If you are having this problem, and are doing a spline lube, that would be a GOOD TIME to check the switch. You can also check the switch before you do the spline lube to see if you want to either be ready to clean the switch or install a new one.

The same switch is used on both the K bike and R11 transmissions. I suspect the R12 and the new R11S with a six speed transmission have a similar switch. But since it is sensing six speeds instead of five the contact closure will be a bit different.

The TGPI switch lives on the back end of the transmission and behind the swing arm. It is not easy to get to. (Thus I have not taken one of the suspect units out, or asked those with one, to take theirs out and check it.) But it is possible to check the switch in place to see if there is water or corrosion in the switch and if cleaning or replacement should be considered. Here is how to do that, and more than your really ever wanted to know about the switch.

The switch connector has four wires/conductors, one common, and three sense wire/conductors. Brown, Yellow/Blue, Yellow/Black, Yellow/White. The Brown is the common. On K bikes, the connector is on the right side below the fuel tank. The TGPI switch itself is actually three switches. They close and open as the transmission gear is changed. The indicator module interprets the switch closures and displays the correct gear depending on which switches are closed.

Looking at the connector, the wires are arranged as follows:

```
                  ___
                 /   \
           Brown |o o| Yellow/White
     Yellow/Blue |o o| Yellow/Black
                 |___|
```

The TGPI switch part where the cable/wires attaches has a central connection point for the common connection, and then three circular tracks surrounding it. Portions of the tracks have metal strips. This is where that particular switch is closed. The Yellow/Blue wire goes to the inner track, the Yellow/Black wire to the middle track and the Yellow/White wire to the outer track. This part snaps onto the transmission mounting base. The base has a separate inner circular part keyed to the transmission shift drum. This part has an inner connection to the common lead from the wire part. There are three spring loaded, to maintain contact, pins sticking up from the circular part. The pins are connected to the common lead in the circular part. The spring loaded pins make contact with the wire part metal tracks. If you take the TGPI switch apart DO IT IN A SHOE BOX! Those spring loaded bits will try to escape, and they are small and hard to find. :(:(The wire part has a locating lug and a circular seal to reduce or prevent moisture entrance. Moisture might also be able to enter between the base and inner circular part. The switch I had, had grease at these points, but it might not be enough to prevent moisture intrusion.

The contact closure between the common brown wire and the sensing wires is as follows. (An "X" indicates a connection.):

	Yellow/ Blue	Yellow/ Black	Yellow/ White
1st		X	X
Neutral	X	X	X
2nd	X		X
3rd			X
4th	X	X	
5th		X	

To check if you have corrosion products in the TGPI switch from water entry, and an indicator, IMO, of potential trouble, test the switch in 3rd and 5th gear. With the transmission in 3rd gear, there should be a completely open circuit between the Brown wire and the Yellow/Blue and the Yellow/Black wires. My VOM indicated NO CONNECTION, NADA, Infinity. The resistance between the Yellow/Blue and Yellow/Black wires will be the same, wide open. There will be an excellent connection from Brown to the Yellow/White wire. With the transmission in 5th gear, there should be a completely open circuit between the Brown wire and the Yellow/Blue and the Yellow/White wires. My VOM indicated NO CONNECTION, NADA, Infinity. The resistance between the Yellow/Blue and Yellow/White wires will be the same, wide open. There will be an excellent connection from Brown to the Yellow/Black wire. If you find some resistance where it should be open, this is not a good thing. It says there is something conductive there that should not be there.

I also checked when various tracks are connected to the common connection with the TGPI switch in front of you, off the transmission. As I noted there is keyed opening for the transmission shift drum to mechanically connect to the switch. For this description, where the wire comes out of the switch is 12:00. The switch is mounting base up and the key location can be seen. The "pointer" is on the same side/location as the key, and perpendicular to the key flat. With these conventions, the Brown wire is connected to the Yellow/Blue during 3:00-5:00 and 8:30-10:30. The Brown wire is connected to the Yellow/Black during 1:00-2:00, 3:00-4:30, and 9:30-11:30. The Brown wire is connected to the Yellow/White during 5:30-7:30 and 8:30-11:30.

The wire/contact tract isolation test can also be done with the switch off the transmission. With key flat horizontal, or the "pointer" at 6:00, there should be a completely open circuit between the Brown wire and the Yellow/Blue and the Yellow/Black wires. My VOM indicated NO CONNECTION, NADA, Infinity. The resistance between the Yellow/Blue and Yellow/Black wires will be the same, wide open. There will be an excellent connection from Brown to the Yellow/White wire. With the key flat "pointer" at 1:30, there should be a completely open circuit between the Brown wire and the Yellow/Blue and the Yellow/White wires. My VOM indicated NO CONNECTION, NADA, Infinity. The resistance between the Yellow/Blue and Yellow/White wires will be the same, wide open. There will be an excellent connection from Brown to the Yellow/Black wire. If you show some resistance where it should be open, this is not a good thing. It says there is something conductive there that should not be there.

On a K bike to remove the switch from the transmission, first wedge out the rubber grommet where the wire passes through the transmission housing. With it out, the connector on the end of the wire will fit through the transmission housing hole. Now the switch can unfastened from the transmission, and pulled off I am not sure if the wire routing is the same on the R11 models. There is another switch on the shift drum shaft on the R11s. I have seen that.

A thank you to Anton Largiader for allowing me to do testing with a switch from him.

Good luck with your switch checking if you have a funky TGPI.

Mounting a Kisan Pathblazer Headlight Modulator on a K75

By Rick Korchak
June 2000

Mounting a headlight modulator is an easy procedure that will help increase the visibility of your bike to oncoming traffic. Headlight modulators rapidly flash the motorcycle's headlight at 240 (plus or minus 40) cycles per minute, which attracts the attention of oncoming drivers. Headlight modulators are completely legal in all 50 states [1].

Headlight modulators are designed to increase the visibility of the motorcycle in the most critical area, the left front, to help grab the attention of oncoming traffic. The Hurt study [2] found that "the failure of motorists to detect and recognize motorcycles in traffic is the predominating cause of motorcycle accidents". The study also found that:

- Intersections are the most likely place for accidents;
- That the view of the motorcycle in the accident is limited;
- That conspicuity of the motorcycle is a critical factor, and accident involvement is significantly reduced by the use of motorcycle headlamps (on in daylight) and the wearing of high visibility yellow, orange or bright red jackets; that conspicuity of the motorcycle is most critical for the frontal surfaces of the motorcycle and rider

Headlight modulators are designed to help address these critical factors.

Types of Modulators

Headlight modulators are made by several manufacturers. Some modulate the low beam, some modulate the high beam. Some models let you choose which beam to modulate. The federal law cited above has other specifications and limitations on how they work. For example, all modulators must have an automatic system that stops the modulation at night, but still allows the headlight to function normally. Fortunately, you don't have to worry about how it works, as the modern miracle of microelectronics comes through again and makes it happen!

The Kisan P-115W-S

After careful study (see the abbreviated listing of web sites of modulator manufacturers below), I chose the Kisan P-115W-S modulator for my 1994 K75 standard. The reason I chose this model is that the standard K75 leaves very little room within the headlight cowling behind the H4 headlight to mount any other type of modulator. Most, if not all, modulators plug in to the motorcycle's headlight in place of the 3-prong plug. Some modulators need room for a small circuit board assembly somewhere near the headlight, and some are large units made for bikes with a lot of room behind the headlight. The Kisan P-115W-S is an extremely small unit, measuring only 40 mm wide and 15 mm thick. It plugs directly into the headlight, and it has a separate 3-prong plug attached to a wire cable about 2 inches long that comes off the side of the unit to insert the original headlight wiring from the bike itself. This gives enough room inside the headlight cowling for everything necessary. I had no problem at all in fitting the P-115W-S to the standard K75.

Another reason why I chose the Kisan is that it modulates the high beam. The high beam has a wider pattern than the low beam, and the high beam throws more light to the left than the low beam. This maximizes the effect of the modulated headlight to oncoming traffic, which in the U.S. is on the left side of the motorcycle. In order to be polite, you can switch to low beam when you're stopped in back of a car at a stoplight, so that the flashing high beam isn't too annoying to other drivers.

Note the small size of the Kisan P115W-S modulator (arrow)and the separate 3-prong plug (attached to red shrink wrap).

Tools Needed

- #2 Phillips head screwdriver
- Hammer, preferably a ball peen machinist's hammer
- 1/4" diameter round metal file
- Emery cloth, approximately 100 grit
- Couple drops of oil, 30 weight or motor oil will do
- Electric or battery powered hand drill
- Drill bits: 1/8", 1/4", 5/16", and 25/64" (or 10mm)
- Center punch
- Two six inch or twelve inch scales (rulers)
- Safety glasses or goggles
- Optional: black silicone sealant

Installing the Modulator

The headlight on the K75 is held on, believe it or not, by one Phillips head screw on the bottom of the chrome bezel that surrounds the headlight. Loosen the screw until the bezel is loose. The screw will not come all the way out, but be careful that the headlight itself doesn't come tumbling out of the cowling. After the screw is loose, you should be able to gently remove the headlight from the cowling.

Carefully pull off the 3-prong plug from the back of the headlight. You may have to rock it back and forth a bit, or even pry it out using a flat-bladed screwdriver, but be careful not to bend or break one of the studs. They are meant to be tight in order to ensure contact without vibrating off. There's another little light bulb (the parking light) and a ground terminal (brown wire) on the headlight. Gently pull the small light bulb out, and carefully pull the brown ground spade connector off the terminal also and set the complete headlight assembly aside. You may want to cover the headlight with something so that no dirt gets into the hole where the parking lamp was. Wrap the cable and plugs that come from the bike inside the headlight shell in a towel or plastic bag to protect them during the next step.

Now comes the scary part. In order to comply with regulations to prevent modulating at night, every modulator must have a device that prevents it from modulating when it gets dark, while still allowing the headlight to operate normally. The Kisan modulator assembly has a light sensor attached to about an 18" long wire. This sensor must be mounted through the headlight cowling and pointing up. To do this, you must drill a 10mm (or 25/64") hole in the top of the cowling! Don't worry, it's easier than you think! You need to get over the mental block of drilling into your precious baby, but I justified it by thinking if I messed up, I would simply plug the hole with a black rubber flush mount plug, and no one would notice.

Drilling holes in thin walled sheet metal is a bit tricky, as the drill has a tendency to grab the metal and stall. As an ex-machinist, I know there is a way to sharpen a drill to help prevent this from happening, but it's really not necessary for what you need to do. To help things along, you'll drill a series of pilot holes leading up to the big kahuna, the 25/64 incher.

The hole for the sensor should be dead center on top (12 o'clock position when standing in front of the bike looking at the headlight) of the headlight cowling. The sensor must be located in a way that will prevent oncoming headlights at night from allowing it to activate the modulator, so the best way to mount it is pointing straight up at the sky on top of the headlight cowling. You'll need to locate the hole fore-and-aft along the centerline of the bike, and side-to-side (or port-to-starboard!) in the middle of the top of the headlight cowling.

To locate the position for the hole, I measured back 35 mm from the front edge of the headlight cowling, which locates the hole about in the middle of the space from the front of the headlight to the beginning of the instrument module. Finding the exact center side-to-side is a bit trickier. You can eyeball it and get pretty close, or I found that you can locate the center by using your two scales. Use one scale to measure up from the Allen headed screw on one side of the cowling (they are located at the 3 o'clock and 9 o'clock positions) and then over to find the center. Repeat this from the other side until you find the spot where the distance is the same. This should be the center. It turned out that on my bike the center was located 115 mm from each screw.

Now you're ready to start drilling. First, put on your safety glasses or goggles. You must wear eye protection to do this. To start the hole, you must use a center punch to create an indentation to help locate the drill bit, otherwise you will not be able to get the drill to start without wandering. Don't use too much force, as the headlight cowling is just thin aluminum and you may put a bigger dent than you bargained for. Don't ask me why I know this! If this does happen, you can gently tap the headlight cowling from inside to straighten it out a bit.

You can't simply drill a 25/64" hole first thing. You must drill a pilot hole first to guide the bigger diameter drill. I drilled a series of holes using progressively bigger diameter drills. Start with the 1/8" bit. After you have that hole drilled, put a drop or two of oil around the hole to help lubricate the next. Drill the 1/4" hole, then the 5/16", then the drill the final hole using the 25/64". This one may want to grab the edges of the hole, so be careful. If it gets jammed, simply reverse the drill and let it back itself out. You may find that if you start the drill before touching the metal it may go smoother.

After drilling, the hole will have a burr. You must remove the burr using the round file and the emery cloth.

Now the hard part is over. Here's where my experiences in installing the modulator hopefully can help you prevent the mistake I made. The instructions that come with the Kisan modulator are not very clear on how to actually mount the sensor in the hole. I even called Kisan to ask about this, and they were very helpful, but I realized later that I still didn't understand the procedure.

The Kisan modulator comes with a small black grommet to mount the sensor in the hole. The grommet slides around the cable that holds the sensor, then fits up tight against the sensor head itself and pops into the drilled hole. The grommet is designed to keep the sensor tight and waterproof. Here's how to do it right: first pull the sensor itself up through the hole. THEN put the grommet around the sensor cable (it has a vertical slit to allow you to do this). Locate the grommet up around the threaded part of the sensor, and then push the sensor and the grommet unit down into the hole. This may seem obvious, but it wasn't to me, and the directions weren't clear to me either. Anyway, it should snap in and it will be a pretty tight fit. I had to file my hole a bit to get it to fit, and I over did it, so the fit was a tiny bit loose. I put a dab of black silicone sealant around the inside of the hole to make sure it stays waterproof. You may want to do this anyway, just as extra insurance against leakage.

Now we're getting close. Plug the Kisan modulator into the back of the headlight. Caution: only push the modulator on until it stops, don't try to force it any more after that! Replace the small light bulb and the ground terminal. Attach the original headlight 3-prong connector that comes from the bike into the 3-prong receptacle on the little extension cord that comes out of the side of the modulator. Replace the headlight assembly and attach it by tightening the screw in the bottom of the bezel. It's easy to over tighten this, so be careful or you'll strip the threads. Congratulations, you're all done! Start the bike and turn on the high beam, and after about a second the headlight will start to modulate. Life is good!

One thing to remember, you need to be in enough light so that the sensor doesn't prevent the headlight from modulating. If you flick on the high beams and the headlight doesn't modulate, you may not have enough light in your garage or wherever you're working. The sensor seems pretty sensitive, so even though I had an overhead bulb on in my garage at night while I was working, it didn't come on until I turned on another light. Try waving your hand above the sensor to see how it turns the modulator on and off.

Hope this procedure is easy to understand and helps you. If you have any questions, give me a shout at rekorchak@att.net.

Drive safe!

Rick.

References

1. Motorcycle Accident Cause Factors and Identification of Countermeasures", Volume I: Technical Report, Hurt, H.H., Ouellet, J.V. and Thom, D.R., Traffic Safety Center, University of Southern California, Los Angeles

2. U.S. Department of Transportation, National Highway Traffic Safety Administration. Federal Motor Vehicle Safety Standards 49 CFR Part 571, Docket No. 97-87; Notice 1. Executive Order 12866 (Federal Register: February 21, 1996, Volume 61, No. 35)

Other Sources for Headlight Modulators

Kriss Industries www.kriss.com

Signal Dynamicswww.signaldynamics.com

PIAA 910 Installation

By: Gary Harris March 1999

Over the weekend I installed a set of PIAA 910's (110W) on my K11RS. I thought I'd pass on some info in case some other K11RS owners (Ted?) are looking to install driving lights as well.

Earlier this winter I cried out in a desperate search for suitable brackets that would let me hang a pair of lights from under the mirrors on the K11RS. The brackets I had used prior proved to be too weak to hold a set of PIAA 1000's. I had gone thru 3 breakages.

Richard Bernecker stepped up and had a set of aluminum brackets made per his specs and sent those brackets on to me to try. I first want to thank Richard for his efforts. (To this date, he has yet to ask for a dime. I will find some way to repay him.) Ultimately, however, I did not used those brackets. Although the fit was perfect, the aluminum was too soft and I didn't think the platform would be solid enough to hold the weight of the 910's.

Standing there wondering what to do next, I remembered a pair of brackets that came with a turn-signal relocation kit I got for my ZX-9 from RKA Luggage and never used. The first time I tried these brackets, about two years ago, they were too thick to fit between the mirror and the mounting plate. Butt, I thought, what about putting them *behind* the plate just like Bernecker had in mind? (Don't know why I didn't think of this two years ago ;-P). VOILA'!! I works!! Well, almost...

The thickness of the bracket rendered the lower stock screw useless as it was not long enough to make it completely thru the assembly and hold the bolt. Off to Pergament...

Back with 2 1/2" machine screws and we have a fit!! The bracket is mounted... actually, in effect, it is rubber mounted thanks to the rubber spacer.

Now, slip in the post of one PIAA 910... hmmm... to long... touching mirror... Off to Pergament, again...

Back with 3/8" washers. Slip 3 washers onto post before sliding thru bracket... now slide into bracket... Nice!!! Post clears mirror by...oh... 1/8". Bolt down and one 910 is mounted!!! Repeat for other side. Do wiring and stuff. Go to reinstall fuel gauge... hmmm... what's wrong? .... why won't it go in?... Oh.... Dammit!! That 2 1/2" screw is in the way!!! It's TOO long!!!

Off to Pergament...AGAIN!!

Back with small hacksaw... saw off about 1/4" of that screw... reinstall fuel gauge. Repeat for left side and temp gauge.

The 910's are installed! Looks good! A solid mount! The bracket is a perfect size... It's also very strong. I stand back and smile!

The last thing I did was attempt to weather-proof the PIAA switch. HowdidIdothat? Well, I opened up the switch casing and liberally covered the circuit board with silicone rubber sealant (do not apply to button!). I then covered the seams just before tightening the screws. Time will tell if this works.

If you're interested in doing this for yourself, here are the details:

What you'll need:

- ONE (or more) BMW K1100RS motorcycle(s).
- ONE PIAA 910 kit.
- ONE Turn signal relocation kit from RKA Luggage - I'm not sure if this is a universal kit, butt, if they ask, tell them it is for a '95 Kaw ZX-9. Important: You'll notice these brackets each have two elongated holes. One on each side. One hole is centered, the other, luckily, is offset. The side with the centered hole goes behind the mirror mounting plate and hangs on the metal insert (going thru the rubber spacer) for the lower screw. Hang each bracket so that the offset hole is closest to the front of the motorcycle. That means one bracket should be for the left side only, the other for the right side only. This offset works perfectly with the angled front lower face of the mirror, allowing just enough clearance for the 910's mounting post. Beautiful!!!
- TWO 2-1/4" machine screws. Same "size" as the stock mirror mounting plate Phillips screws, just 1/4" longer. (or... 2-1/2" screws and a small hacksaw! ;-))
- Six 3/8" (inner diameter) flat washers.
- Extra 14 gauge wire to extend ground wires (depending on where you mount the relay and harness). PIAA recommends grounding the system as close to battery ground as possible to get maximum bulb life.

As far as the wiring goes, just follow the PIAA instructions. Be sure, however, that you are able to READ the instructions. My package was apparently intended for Korea or someplace as ALL of the instructions were in either Korean or some dialect thereof. Since I had already done one PIAA installation, I wasn't really concerned.

I connected the power sensor wire to the stock hi-beam wire (white) so the PIAA can be used as the hi-beam is used.

Improving the Brake Light Visibility of a K75

By Rick Korchak
July 2000

I recently installed a "Signal Dynamics" LED brake light bar and a pair of "LifeBrite" LED brake light flashers above the license plate on the rear of my K75 standard. I believe these products will improve the ability of vehicles following me to see and recognize that my brake lights are "on" when I am braking. This modification can probably be done easily to many different types of motorcycles, so it isn't something that is meaningful to the K75 only.

My goal was to both attract attention to the fact that I am stopping and my brake lights are on, and also to increase the amount of overall brake light power. What I did was lower the license plate by 13/16", mount the Signal Dynamics light bar above the license plate, and the 2 LifeBrite modules above the light bar, one each located above the two original license plate attachment holes. This turned out to be a fairly easy process. My theory is that the small blinking LifeBrites attract attention to the rear, then the standard brake light boosted by the Signal Dynamics brake light bar do the rest.

The Products

I found the Signal Dynamics (www.signaldynamics.com) LED brake light bar at my local dealer, who sells Harley-Davidsons and BMW's, but it can be ordered directly over the Internet (April 2000 prices $39.95 w/black frame; $41.95 with chrome frame + S&H). This product is a 6" wide metal bar with a 5" long by 1/2" wide LED light array. It is designed to be both a running light that is on whenever the bike is running, and also as an additional brake light that activates with a bright steady glow whenever the brake lights are on.

I was intrigued at how bright the LED's were when the light was activated on the counter display. The unit has two holes on either end, and is designed to fit above the license plate on most motorcycles, simply by fitting the light bar over the top of the license plate and replacing the existing license plate bolts with the ones supplied in the kit. I had a slightly different idea though, so I bought one and took it home.

While searching the web one night, I also found a company called "LifeBrite" (www.web-rider.net/lifebrite/what.html). They make a variety of small LED's, each one about the size of a domino, in either yellow or red. The red ones are used as auxiliary brake lights; one style comes on when the brake lights are on and has a steady glow; one variety flashes for 5 seconds when the brake lights are activated, then glows steady as long as the brake lights are on; and there is also a pair that flashes continuously as long as the brake lights are activated. I purchased the pair that flashes for 5 seconds and then glows as long as the brake lights are on (April 2000 price $49.50 the pair + S&H). I also purchased a pair of their laser-cut, sheet metal mounting tabs sold on the website to use to mount the units ($7.50 per pair)

Tools Needed

- Good quality scale (ruler)
- 1/8" drill bit
- 1/4" drill bit
- Drill
- Soldering iron and solder

- Electrical tape
- 1/4" heat shrink wrap tubing (inside diameter shrinks from 3/16" to 3/32", can be found at either auto parts store or Radio Shack)
- #2 Phillips screwdriver
- 3/16" flat bladed screwdriver
- 5/16" box end wrench
- (2) 3/3" long stainless steel XXX head screws to use in place of the screws that come with the Signal Dynamics LED light bar.

Mounting the Lights

First, I unbolted my license plate and cleaned the plastic mounting area that comes standard on the K75. The next step is to drill two 1/4" holes, located 13/16" directly under the existing license plate holder holes. To do this, you must first drill a pilot hole, or the 1/4" drill will "walk" over the plastic, and you won't be able to correctly locate the holes. I used a smaller 1/8" drill bit to drill the pilot holes. Before you drill, though, place a scrap piece of wood behind the license plate holder, to help prevent the drill from going beyond the thin piece of plastic and into the fender itself.

On my bike, the Signal Dynamics unit fits exactly over the original license plate mounting holes. The unit comes with a rubber backing to help prevent vibration I found that the 1" long stainless steel screws that came with the Signal Dynamics unit were too long to use for my purposes (probably because they are designed to be used for mounting the unit over the license plate also), so I went to the local hardware store and got two 3/4" long replacements. I used the same washers and nuts that came with the Signal Dynamics unit. I mounted the Signal Dynamics light bar into the original license plate mounting holes, and also slid on the sheet metal mounting brackets for the LifeBrite LED's over the mounting screws in back of the light bar and the plastic original license plate mounting area.

The sheet metal brackets have a slot in them, so that the Signal Dynamics light bar mounting screws can go through them at the top, and the license plate mounting screws in their new location can also be slid through them on the bottom. This nicely locates the brackets and prevents them from moving around.

The license plate can now be bolted into the new holes that you have drilled, using your existing license plate nuts and bolts. You may have to widen the holes in your license plate slightly to fit; mine were just barely wide enough for the original mounting location, so I used a pair of tin snips to cut away a section in each hole in my plate to make it slightly wider.

That's about all there is to it to mount the units; the hardest part is making sure everything is lined up and getting all the washers and nuts on the back, it may take some maneuvering with your fingers to get everything going right.

This photo shows the mounting of the units, but doesn't come anywhere near doing justice to how bright the LED's actually are. I think the overall photo got washed out due to my poor photographic skills. I should have zoomed in a bit closer; it's hard to see the Signal Dynamics light bar directly above the license plate, but I think you can get an idea of how tidy the actual installation is.

Wiring the Lights

First thing I did was to slide a piece of the heat shrink tubing over the black, red and white wires of the Signal Dynamics unit. I used my wife's hair dryer to shrink the tubing down once in place. It took a while to get it hot enough to shrink. The wiring comes directly out the back in the middle of the unit; I wish they had used some heat shrink tubing at the factory to hide the red and white wiring, I'm not sure why they didn't. Anyway, it's pretty easy to do this yourself.

There are 3 wires on the Signal Dynamics unit; black is ground, red is power to the brake light, and the white is power to the taillight. There are instructions in the kit; you should always follow them. It is a matter of splicing the LED unit's ground wire to the bike's ground wire (the brown wire on my bike); the red wire to the brake light bulb wire (yellow and gray wire that goes to the connector in the middle of the brake light bulb, on my bike - the brake light is the upper light bulb, and the taillight is the running light, and is the lower light bulb); and the white wire to the taillight (black and grey wire that goes to the bulb on the bottom).

To wire the LifeBrites, the 2 LED units come from the factory spliced together, so it's a matter of simply splicing the black wire to the ground (brown wire) and the red wire to the power wire (yellow and gray) of the brake light (the upper bulb).

I soldered all connections and wrapped in electrical tape.

Using the Lights

Mine work great - I followed my bike with a friend driving it, and you can really notice the added brightness of the Signal Dynamics light bar, and the twinkling LED LifeBrite modules really attract your attention. The only thing I noticed is that when I start the bike, the BMW taillight bulb monitor on the dash panel comes on. I always check the brake lights to make sure they're working before I start out on any ride anyway, so what I do while the bike is warming up is to go to the right side of the bike and step on the foot brake while I peer around the back of the bike. I hold the brake until the LifeBrite LED's stop blinking (5 seconds) and I make sure all the brake lights stay lit. Touch the front brake, and brake light bulb checker will go out on the dash panel, so you're good to go.

I hope this helps you. If you have any questions, feel free to drop me a line.

Ride Safe!!

Rick Korchak

Date: Mon, 1 Apr 1996 15:19:05 -0500
From: jdunkle@telerama.lm.com (Jeff Dunkle)
Subject: Homemade K Running Lights

Home-made modification of K-bike turn signals to dual filament bulbs.

This procedure is my adaptation of one posted some months ago by Mick McKinnon which has worked, he's recently reminded me, successfully, for many miles on his K/LT.

My bike's an '86 K75T with that little cowling around the headlight. So I can't attest to the complete accuracy of this method for other K models. But judging from Mick's use on an LT...it should work. On my bike, all four turn signal assemblies are identical, both externally and internally. I've included a hideous amount of detail to try to help someone who's not tackled a project like this before. Once the shopping is done, the job should only take an hour or so. Two at most. The second time through on a friend's bike should only take about 45 minutes.

Good luck!

Basic Strategy:

We're going to tap current from the parking lamp in the headlight assembly and from the tail/license plate lamp in the rear assembly to power the running lamp filament in the double filament bulb we're going to install in each turn signal assembly. The existing wiring will power the turn signal lamp. Dual filament 1157 are the standard bulb for car turn signal assemblies. These bulbs have a high resistance, low current filament for the running light, and a lower resistance, higher current filament for the turn signals.

The existing turn signal lead in your bike will be connected to the turn signal filament in the new bulb via a soldered wire and blade connector. The running light filament will be powered through the modified socket contact by our added power tap in the front and back.

The existing signal lamp sockets will be modified to allow use of the double filament bulbs.

Suggested Tools:

- medium duty soldering pencil - 25 watts is fine, rosin core solder
- wire strippers/crimpers
- tin snips (or similar tool)
- Phillips screw driver

Materials:

Note: The following materials are the quantities needed to modify all four lights and make two spare bulb assemblies. I suggest you get extras of each to allow for practice and mistakes in such things as mis-crimping a connector, etc. All of these materials should be obtainable at a good auto parts store or hardware store with electrical supplies.

- about 6 feet of #18 (OR LARGER) wire
- 6 each 1157 bulbs (the dual filament turn signal bulbs
- 2 each male blade connector doublers
- 6 small male blade connectors
- 2 each female blade connectors large enough to fit over one of the doubler male blades

- 4 each small female blade connectors
- 6 each small male blade connectors that fit the females in the line above

Modifications to the 1157 dual filament bulbs:

1. File the locking pin off each bulb of the six bulbs that is furthest from the base. Now put two of the bulbs aside as a test fit bulb to help you modify the sockets. Do the soldering described to the other four bulbs.
2. Cut four lengths of wire a bit over two inches long. Strip about 1/4" inch of insulation from each end.
3. Hold each bulb base up, with the remaining locking pin pointed away from you. Solder a length of wire from step 2 to the left contact, with the wire pointing toward you. This positions the wire to have minimum interference later. This is is the turn signal filament connection.

Front turn signal modifications:

Additional wiring installation

1. Remove turn signal lenses, lamps and disconnect socket bases from wires and remove them. Note which wires come from which connectors. The brown wire on BMWs is always a ground wire. The other wire is the power lead for the turn signal. This wire will eventually be connected to the soldered wire on the dual filament bulb. We will connect a different, to be installed ,wire on the base connector that this wire came from.
2. Remove enough body work to access the back of the headlight connector.
3. Disconnect the female blade connector from the "parking" lamp in the headlight assembly. Install one of the male blade doublers onto the existing male contact for the parking lamp. Reinstall the original female connector onto one of the doubled blades. If the existing female connector doesn't fit the new male blade, install a new, larger female connector onto the bike wire.
4. Take two lengths of #18 (or larger) wire about 16-18" long. Strip about 1/3" inch insulation from one end of each length. Twist the stripped ends together.
5. Crimp a female blade connector to these twisted wires. Install this blade connector to the other male blade on the doubler on the parking light.
6. Reinstall the headlight assembly taking care to reposition the adjustment knob bracket properly. Bolt the assembly down to the frame. Snake one of the newly installed wires through each turn signal stalk and reinstall the turn signal brackets. Leave enough of the remaining fairing off for the moment to permit headlight removal again, if necessary.
7. Cut the excess off the wires just pulled through the turn signal stalks, leaving about 4 to 6 inches of excess so that the wire can be easily inserted again should the fairing and turn signals ever be removed. Strip the end and crimp on a female blade connector.

Socket modification

This step will modify the existing single filament base so that the existing contact will touch the running light filament button on the base of the dual filament bulb.

1. Temporarily twist one of the dual filament bulbs (with the upper lock pin filed off but without a wire soldered to it) into the socket. Note that one side of the socket interior has a metal side next to the bulb base. Insert the lamp so that the remaining locking pin engages that metal side of the socket. Twist till locked.
2. Note that the base contact covers both contact buttons on the bottom of the bulb. Scribe a scratch on the contact so that a cut there will permit the metal to touch only the nearest bulb contact button. Remove the bulb and carefully cut the contact where marked. A little bending and filing

may be in order to reposition the contact properly. Test fit the bulb to be sure of adequate contact on only the near button.
3. Repeat for the other socket.

Socket/Bulb Installation

1. Insert a modified bulb with a wire soldered to the one button, into a modified socket. Connect the brown wire to the ground lug of the socket (THE SAME ONE IT CAME OFF OF...THE ONE THAT CONTACTS THE SIDE OF THE BULB BASE).
2. Connect your newly installed wire to the blade that contacts the one bulb base button.
3. Connect the original colored lead to the blade connector soldered onto the bulb. If the original female connector doesn't fit, cut it off and install a female blade connector sized to match the male on that lead. Connect these wires.
4. Repeat the above steps for the other side.
5. Carefully allow the sockets/bulb assemblies to dangle without touching any wires together. Test the lights. If they work correctly, proceed. If things don't work properly, first test the lights with to be sure they're not burned out. Then trace wiring to check all connections. Be sure that the double blade connector in the back of the head light isn't bent against the body work, etc. Be sure all crimped on connectors are properly installed.
6. When things are working properly, snap the light/base assemblies into the lenses, and reinstall the lens assemblies.

Congratulations! You're over half done....the rear goes faster.

Rear Turn Signals:

This is essentially a repeat of the above sequence. Here we're going to tap current from the lower light which is the tail light/license plate lamp.

1. Remove the turn signal lenses, remove the existing bulbs, disconnect and remove the socket bases.
2. Remove the tail light lens. Access to this is via thumb screws inside the rear compartment on my bike, at least.
3. Disconnect the female blade connector going to the lower lamp. Install a male blade doubler on this connector.
4. Reconnect the existing female blade connector to one of the doubled male connectors.
5. Fashion a twin lead wire with approximately the same length leads as done for the front. Take two pieces of wire about 16 inches long, strip one end of each, twist together, and crimp on a female blade connector.
6. Connect this wire assembly to the other doubled male connector.
7. Snake one of these installed wires through each turn signal base.
8. Reinstall (TEMPORARILY) the tail light assembly. Check to be sure that the doubler connector doesn't impact other wires or structure when things go back together.
9. Pull the new wires through each turn signal assembly. Cut off excess wire, leaving about a 4" inch excess (TO FACILITATE RE-SNAKING IF THE TAIL LIGHT IS EVER DISASSEMBLED AGAIN).
10. Strip 1/4" inch of insulation and crimp a female blade connector to each wire.

Base Modification:

Modify each rear turn signal light base exactly as was done for the front.

Light Modification:

You should have two more bulbs with leads already installed. Make two more as earlier directed, if necessary.

Install a bulb in each socket and reconnect the socket base wires.

1. Brown wire to ground lug.
2. Installed wire to the base contact.
3. Original turn signal connector to the soldered on lead. Again, install a replacement female blade connector if the one on the wire is too small for the crimped on male on the soldered wire.
4. Allowing the sockets to carefully dangle without touching anything, test the newly installed lights.
5. If they work, snap the sockets into the lens assemblies and re-install the lenses to the stalks.

If things don't work, first test the bulbs for damaged filaments. Then trace all connections to be sure they're proper and that crimped on connectors are properly installed.

Reinstall all remaining body work.

Now, fabricate at least two spare 1157 bulbs to cary along. File off the upper lock pin and solder on a 2" lead with a crimped on male blade connector as discussed above.

Congratulations. Done!

Please contact me with any corrections you note in your work or any questions about this installation.

Ride Safe,
Jeff Dunkle


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~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
| Jeff Dunkle                        '81 BMW R100/7 "The Black"   |
| Boof #17, K-whiner #41             '86 BMW K75T "Shadow"        |
| jdunkle@telerama.lm.com              Assorted Other Bikes       |
| Four Winds BMW Riders                   (minus one)             |
| Pittsburgh, PA                                                  |
|                                                                 |
| "We must learn and make practical in our everyday lives the law |
| of Good Relationship."  Brooke Medicine Eagle                   |
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Installing Headlight Relays

By: Brian Curry

How would I go about installing headlight relays on my K-Bike?

Necessary parts:

Two relays such as for horns. They do not have to be Bosch but they need to have decent current ratings. Horn relays are fine. The contact current capacity needs to be at least 6 amps and 10 is a lot better. I would not use Radio Shack because I think that what you get at an auto parts place would be more appropriate for the service. (Rough and tumble, and sealed.)

Some 14 gauge wire. Tom Coradeschi recommends 12 gauge be used. It can be used, but is more bulky. Rob used 14 gauge. Do not use 16 gauge. You want heavy wire to carry the current without voltage drop. Use the biggest you feel you can run and can get a fuse for. Also, it should be nice and flexible with lots of strands.

Crimp-on electrical connectors and a tool to _properly_ crimp them or good soldering skills.

Distructions: ;)

Use caution around the battery, it may only be 12 volts, but there is a lot of amp capacity there. Shorting it out, can result in ARCS, SPARKS, SMOKE, and EXPLOSIONs. Not good things at all. Use caution!

You are on your own for removing panels, covers, and the fuel tank. You will need to:

Disconnect the battery, by removing the battery negative lead.

Find a place close to the head light to mount the relays. On a K75S I would probably mount them on the instrument pod support in front of the steering head. This is nice and close to the head light. Mount the relays. Do not drill holes in critical high load bearing frame members.

Run a ground wire to one terminal of the relay coils. I would run the ground from the frame ground under the tank. While this ground could be continued to provide a ground for the head light, I would probably run a second separate ground for the headlight. (Connected later)

I would tap the battery hot lead at the starter relay in the electrical box under the rear of the fuel tank. This is a nice protected location. It is bolted. It is not exposed to road grime or battery acid. FUSE THIS LEAD close to the start relay and inside the electrical box!!! Run the lead up to the relays and connect it to one side of the normally open contacts on each relay. (Doesn't matter which terminal is used of the contact set.)

Cut the leads going to the head lamp socket leaving a ~1" pigtail on the socket. You will have a yellow lead, white lead and a brown lead. The wiring harness brown lead is the ground and does not have to be used, or you could use this for the relay ground and not take the relay ground from the frame ground. If you do not use it, tape it so that it does not flop around and contact the wrong thing accidentally. :(Connect the wiring harness yellow lead to one relay's coil terminal. Connect the previously unused terminal of the relay contact to the yellow pigtail on the head lamp socket. Use the 12/14 gauge wire for the contact terminal to pigtail connection. Connect the wiring harness white lead to the other relay coil's unused terminal. Connect the unused relay contact terminal of this relay to the white pigtail on the head lamp socket. Use the 12/14 gauge wire for this. Connect the new 12/14 gauge ground lead from the frame to the headlight socket brown pigtail.

Put a fuse in the positive lead fuse holder!

Smoke testing:

Reconnect the battery negative lead. (Since you have the wire and the connectors, this is a good time to install a second battery negative lead. I would connect a second one from the battery negative terminal to the same point on the frame as you ran the other grounds from.) Watch and look for smoke. :(

Turn on the ignition. Watch and look for smoke. :(

If you have a Euro headlight switch, turn on the head light.

The low beam should come on. Check the hi-low operation.

You should be able to hear the relays pick up and drop out as you operate the switch.

Reinstall the tank, panels, and covers. Take a ride. Enjoy the light. :) :)

If it does not operate properly, use a indicator light, DVM, or VOM to see what is energized and what is not, and what connections are made up and what is not.

If still lost and not working, send e-mail. ;) ;)

```
 Hi-Lo
 Switch       Approximately 16-18 gauge wire.
      o---------------------------------------------------------------|
  _/                                                                  |
                                                                      |
      o--------------------------------------------------|            |
                                                         |            |
                                                         |            |
Note: Before the power                                   |            |
      gets to the Hi-Lo                                  |            |
      switch it also goes                                |            |
      through other switches                             |            |
      and wiring.                                        % Low        |
                                                         | Beam       |
                                                         | Fil.
% High
|            |Beam
                                                         |
____________| Fil.
|
                                                        ---   Return/
ground
                                                         -
                                                         '

                              ORIGINAL CIRCUIT
```

```
      Battery/starter
       relay terminal    Fuse   12/14 gauge wire all of this part
                                of the circuit.
           +  ----------~~~~-------------------------|------------|
                                                     |            |
  Switch                                             |            |
      o-------------------|                          |            |
  _/                      |                          |            |
                          |                          |            |
      o---------|         |                          |            |
                |         |                          |            |
                |         |                          |            |
                |         |                          |            |
                |         |                          |            |
                |        / \ Relay   Mech. Conn.    _|_  Relay    |
                |        \ /  ---------------------  ___  Contact |
                |         |                          |            |
                |         |                          |            |
               / \ Relay  |  Mechanical Connection   |           _|_
Relay
               \ / -----  |------------------------- | --------  ___
Contact
                |         |                          |            |
                |_________|                          |            |
                |                                    |            |
                |                                    % Low        |
               ---                                   | Beam       |
                -                                    | Fil.       %
High
                '                                    |            |
Beam
                                                     |____________|
Fil.
                                                     |
                                                    ---   Return/
ground
                                                     -
                                                     '

                              REVISED CIRCUIT
```

Good luck!

Additional Info on Installing Headlight Relays

By: Brian Curry

Thanks to Alessandro Bruno for raising these issues and prompting some elaboration.

Getting a 12 Volt supply from the Starter relay:

> The start relay has two large contacts with bolted connections. The wires have red insulation. From memory, the rearmost connection, goes to the battery. Trace this to confirm it, BMW has been known to make changes. Disconnect the battery negative terminal. (This keeps down the sparks if you make a mistake and short something.) Remove the starter relay wiring bolt. Get a crimp connector that the bolt will fit through and that is properly sized for the wire. Crimp the connector on the wire. Bolt the Headlight relay wiring connector with the original connectors onto the relay. (I use some anti-seize on this type of connection.) You now have 12 volts UN-FUSED available when you reconnect the battery negative.

Fusing the 12V supply:

> I found my local auto parts store (Pep Boys) had a real nice "main fuse" holder rated at 30 amps. This should be installed in electrical box, in the wire going to the headlight relays. They also had a 30 amp self resetting "circuit breaker" with the same terminal type and spacing as the 30 amp rated fuse holder. IMO, this is a great application. Since getting to a fuse in the electrical box is a PITA, using a self resetting circuit breaker is a very good move. Or if you don't trust circuit breakers, use a fuse. They also make them in 30 amp ratings. This is plenty for the headlights and the size wire you are running.

Headlights and Driving lights:

> If you will be powering both the headlight and driving lights, run two leads. That way if one shorts, you will not lose all the lights.

Use colored wires:

> Use different color wires for different parts of the circuits. Otherwise you have lots of wires all the same color and no idea where they go. If you only have one color put wraps of tape on the wire ends. Different number of wraps on different wires. I suggest Red for the wire from the starter relay to the headlight relays. Then other colors from there.

Relay mounting:

> Silicone rubber/caulk can be used to stick relays on the inside of fairing or any other panels. No more rattling. Velcro also works well. Then they are easier to take off the bike if it is sold. Don't let them flop around!!

Relay numbering:

> If you use relays with contacts numbered in accordance with the German Industrial Standards (DIN) here is what the contact numbers mean:
>
> 85 Relay Coil

86 Relay Coil

The control switch and ground/negative can go to either contact:

15 Relay Contact (Movable) Positive normally after the ignition switch
30 Relay Contact (Movable) Normally connected to the Battery
87 Relay Contact Closed when energized
87a Relay Contact Closed when de-energized

While the 12V power lead can be connected to either contact, it is nice to follow the convention with the lead from the start relay connected to 30 and the headlight lead to 87.

A lot of relays, even those made and used in the US, are starting to be DIN labeled, so even if you don't get it from BMW or another European car dealer, they may well be numbered. Look. If your relays are not labeled, you will have to spend some time with a meter figuring out what is what.

For those in the US and maybe Canada, Radio Shack has a nice little relay at a good price. It is RS part # 275-226. The price is US$5.99. It could be plugged into a socket, and it has a little tab with hole that could be used for screw mounting. It is rated at 30 amps at 12 volts. The terminals are numbered as noted above, and are sized so that you could use push on connectors. The data shows the coil resistance as 66 ohm, and 160 milliamps which is nothing. It also notes that it will pull in at 6 volts and drop out at 3.6 volts. So, there is a "common" relay source for those in the US.

Headlight Relay Installation

By Robert Laposta
June 2001

I just wired up head light relays on my K75. The posted instructions were way too much like rocket science and I didn't understand it until Scott Conary put it in slightly simpler terms [see below]. When I finished I got on photoshop and made this diagram, printed it out to a .pdf file for mass viewing. Hope it helps. Feel free to post.

Scott's words...

You run a big fat fused power lead from the battery. Split into two, one line for each relay - one relay for hi, one for low. Use automotive type relays rated for 30 amps. I bought mine at Radio Shack.

Let's play with the high beam, we'll pretend that its power comes through a white wire (it might, I don't remember). The brown wire going to the headlight is the ground for both beams.

Each relay has 4 'plugs'.

- One for the BIG power in(A).
- One for the BIG power(B) out.
- One for small power in(C).
- One for ground(D).

(The relays have a nice diagram on their underside and the back of the package)

Cut the white wire going to the headlight. Take the piece running from the bike side and attach to 'C'. Run a ground line to 'D'. The relay is now a working switch. When the headlight is turned to hi-beam, power runs to 'C' then through the relay and out 'D'. As it goes through it closes a switch allowing power to run from 'A' through to 'B'. Turn off the hi-beam switch on the handlebar, and power stops flowing through 'C' to 'D' thus breaking the circuit for the BIG power ('A' to 'B'). Nice.

But you still need to hook up the big power. :) Attach one of the Big lines from the battery to 'A'. Attach the white wire that is still attached to the headlight to 'B'.

You might beef up the wire if you're feeling industrious. While you're there, also beef up as much of the brown lead to the headlight as you can.

And now your hi-beam is run through a relay. Because you used nice big wires, and it doesn't have to run through the dirty nasty little switch on the handlebar, you can run much more juice to the headlight.

Now do the same for the low beam.

I used spade type connectors so that I could remove the relays if I wanted to. I mounted them just above the headlight, attaching them to the underside of the top center piece of the fairing (the bit the windscreen attaches to). Fuse the main power lead, and use the thickest wire all around that you think is reasonable. Even if you stick to a stock size bulb, you should see a nice improvement in brightness from the headlight.

Robert Laposta
iBMWr ; IBA #7268 ; LPR #71
'87 K75S - "Maybelline"
'75 Honda CL360, which threw me, wench...
'72 Indian ME-70cc dirt bike

Tail Light Bulb Upgrade

By: BMWDUCMAN@aol.com
January 1996

On bikes that use a 1157 tail/brake combination bulb, a simple and inexpensive upgrade in the brake light illumination is readily available.

A 2357 tail/brake combination bulb, available at any auto parts store, will produce the same brightness for the tail light (3 lumens), but will produce 25% greater brightness for the brake light (40 lumens vs. 32 lumens).

The volts required to power the 2357 bulb are the same as the 1157, but there is a slight increase in the amps required (2.1 for the 1157, 2.2 for the 2357). The resulting increase in watts used is only 1.28 watts, or a 4.76% increase over the standard 1157 bulb.

The only draw back to using the 2357 bulb is the rated hours of service for the brake light element is much less (400 hours for the 2357 brake light element vs. 1,200 hours for the 1157 brake light element). The tail light element in both the 1157 and the 2357 are rated at 5,000 hours. Assuming one rides 4 hours per day, 365 days per year and uses his/her brake 25% of the time, if the brighter 2357 bulb is replaced annually, there should be little chance of in-service failure.

Cost for a 2357 bulb is about 97 cents.

In an effort to provide too much info on brighter tail/brake lights, the 1157(standard), the H1157 (halogen) and the 2357(newer version of standard), I have the following info:

Specification	1157	H1157	2357
Volts(high)	12.8	12.8	12.8
" (low)	14.0	14.0	14.0
Watts(high)	26.8	49.9	28.1
" (low)	14.0	unknown	14.0
Amps (high)	2.1	3.9	2.2
" (low)	1.0	unknown	1.0
Base	S8	S8	S8
Candlepower(high)	32	107	40
" (low)	3	25	3
Lumens(high)	402	1,350	unknown
" (low)	38	38	320
Average life(high)	1,200	400	400
" (low)	5,000	400	5,000

The H1157 (halogen) is manufactured by Candlepower, Rockville, Maryland (301) 340-0224.

You can order the H1157 for $10.95 from Nichols Distributing, (800)323-4488.

The biggest concern is the increase in amps and watts(heat) when switching to a halogen bulb. The H1157 brake light element produces 86% greater watts(heat) than the standard 1157 brake light element, the 2357 brake light element only produces 4.8% more watts(heat).

Note: "Heat" is measured in "watts", hence, they are the same.

The other concern with using the H1157 or the 2357 is the shorter service life. The H1157 is rated to last only 400 hours on low(tail) and high(brake) elements. This is drastically down from the standard 1157 and less than the 2357 low(tail) element. Depending on your riding, this problem can be avoided by scheduled replacement.

Hope this info helps for safer riding.

What Do You Mean, "It Won't Start?"

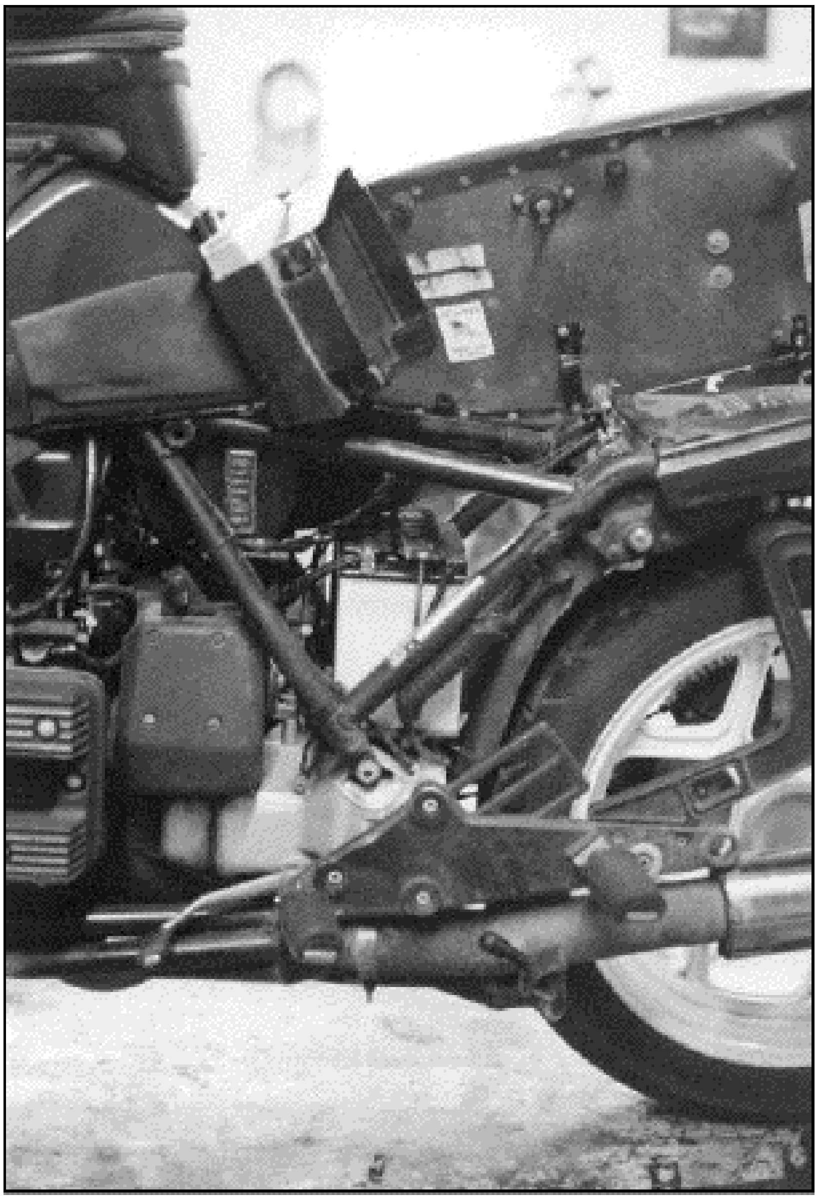
By Don Hamblin

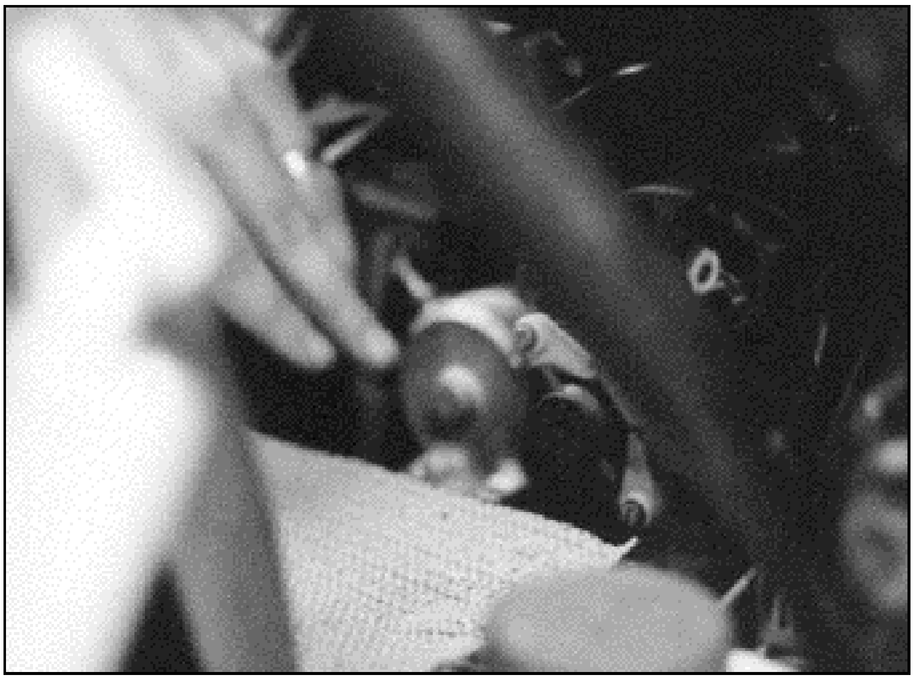
A whole year or so of putting up with, "it won't start when it's hot," had finally gotten the best of me. I'd changed batteries; fuel filters, insulation under the tank, fuel lines, and even brands of gas. Everyone I talked to had a different idea. I'd even learned a bunch of technical stuff (some that I even understood) about fuel injection and fuel flow. Dealers would shake their heads and mumble, and friends would say, "why's he holding us up?"

Finally at the *Return to Shilo* rally, I asked Rick from *Motorrad Electrick.* Less than twenty seconds into my lament he interrupted me and finished my story. Even telling me that I have an '85 or '86 K100 with over forty thousand miles! My reply was, "OK, how do I fix it. And how much is this going to cost me?"

Rick tells me that it's just time to service my starter. **Service my starter?** Along with every other expensive service for the K bike, now I get to service my starter? Come on, isn't there an easier way to fix this problem? Rick tells me yes, I could buy a new relay (expensive, and he didn't think that was the real problem), or a new starter (if I really wanted to waste a bunch of money right off the bat). It's just that the starter needs to be **cleaned** every twenty thousand miles or so. In other words, *not really taking any better care of my starter in its twenty's than I did my own body, is causing me troubles in its middle/ late forties* (motorcycle **mid-life crisis!**)

There's a reason why I'm not a *technical director* or anything like that; I'd rather ride than wrench - that sometimes even includes washing. I've also broken as many things in my lifetime as I've fixed. So, taking the bull by the tail, I called my new friend, John Zibell, and asked to use his garage and motorcycle lift. There's nothing wrong with being lazy! John tells me, "sure, I've had to do the same thing to Jean's K75. Bring it on over."

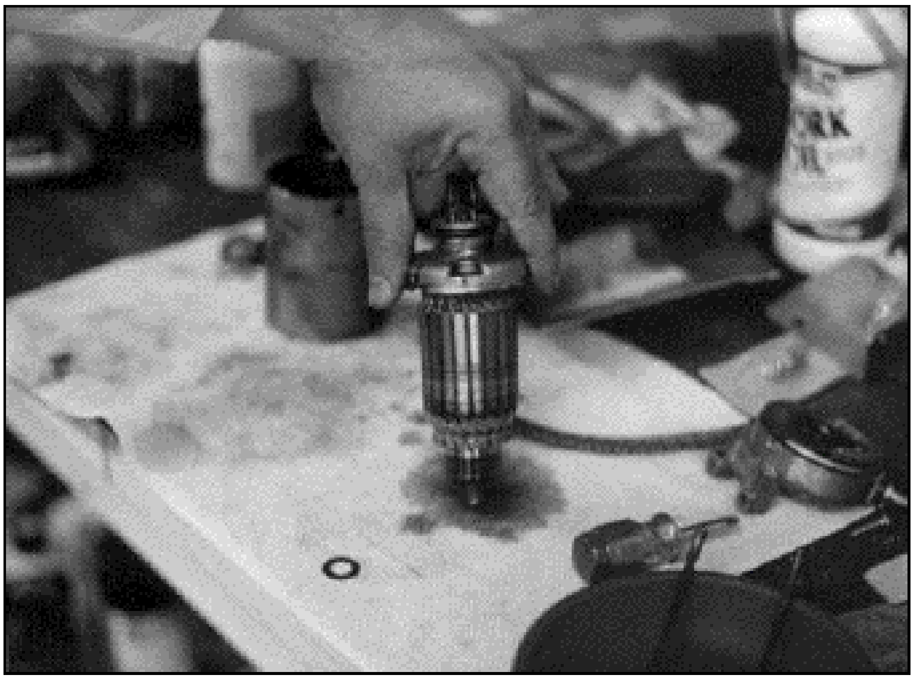




Using the lift made all the difference in the world. Everything's right at eye level. **I love it!** Remove the side panels, lift out the storage tray and computer, tilt up the battery, and there's the starter. A couple of bolts later and you can pull the thing out. (A little note here: It's a little more complicated than this, but any shop manual will "paint by numbers" you through the whole removal. Oh yeah, if you'll remember to let the bike completely cool, the starter slides right out - if not, a little prying is in order.)

Next you should set the starter in a vice (no, don't clamp it, just set it between the jaws - it's really too expensive a Japanese made BMW part to destroy like that) to steady while taking it apart. Keep real close track of the screws and stuff during disassembly so that you can put them all back again. The brushes are real important.

Now you'll be amazed at just how dirty the commutator is (that's the "copper colored" part near one end). That black "stuff" is your problem. A little brake cleaner should remove it all. If not, Rick had suggested using an ink eraser to make it really shine. That's it! Putting it back together is really a lot easier when all that "crud" had been dumped out of the case. Just "reverse" the disassembly process.



John suggested that we test it (you know, hook it up to the battery) and see if it still works. It did! We smile and start sticking all that stuff back on the bike. The acid test was to try it on the bike. Again it worked. That's it. An hour and a half on a Saturday afternoon, and faith is restored.

A quick stop for gas on the way home and no one said, **"why's he holding us up?"**

Starter Cleaning Tips

By Eric Eason
November 2001

Recently my 1984 K100RS has been behaving a little poorly, first I thought it was a flat battery as it wouldn't start and the instrument lights were very dim.

However it bump started easily and didn't give any more problems for a while, then it did it again and after checking the battery I noticed one of the terminal bolts was a little loose, then fine again for another week...

Yesterday it did it again and I knew the battery and the terminals were fine even though it was giving all the symptoms of a flat battery, clicking relay and no or dull instrument lights, bumped it in 3rd again, (this time on the flat, best if you take off the left pannier off first).

At home I thought about cleaning the ignition switch but then decided to pull the starter from my other k, which was without battery, and try that, started fine!

Now this is one of those things i've been avoiding but in the end it only took about an hour and very easy to do, here are a few hints.

1. Removing the battery is easy if you twist it 45 degrees and then use the edge of the battery to force back the plastic mudguard so you can finish the turn to 90 degrees, now it should pull out straight up.
2. Leave the battery tray in, after removing the 2 starter mounting screws slide the starter back an inch to get to the plastic cover and the 10 mm nut on the terminal, (getting the starter back is tricky if it's never been out before, you just have to keep on jiggling it while pulling, it comes out eventually).
3. The 2 long screws holding the starter together are in very tight, I put it in a vice and used a phillips bit on an extension in a 3/8 socket wrench to crack them.
4. Once they are out it is easy to slide off the end cap and gently free the brushes and holder from the rotor, be careful pulling off the endcap as it is connected to the brushes by a wire and you don't want to pull that off.

For the rest see these photos, keep pressing next:

http://communities.msn.ca/2wheelsgood/shoebox.msnw?action=ShowPhoto&PhotoID=110

eric e

K-Bike Starter Doesn't Seem to Work?

By: Tom Coradeschi

A question heard fairly regularly seems to go something like:

I've had an intermittent problem starting the bike and with the lights. Sometimes with the key on the headlight and instrument lights will not come on (the neutral light will come on if it's in neutral). When I push the start button nothing happens. If I put the bike in gear, let out the clutch and rock the bike back and forth the lights will flicker on and off. Once the headlight stays on I can start the bike. While I'm riding the headlight may flicker or go out for awhile but the bike seems to run fine. What's wrong? Do I need a new starter?

This is fairly common. The Load Shed relay, which controls the lights and such, is grounded thru the starter. If the starter is all loaded up with dust from the brushes (they wear over time), you will not be able to ground the relay and the lights won't come one. By the same token, you won't be able to run the starter!

When you put the bike in gear and rock it back and forth, you're also causing the starter to rotate (when the bike is rocked backwards). This movement tends to clear the dust from between the starter rotor and the brushes and (temporarily) cure the problem.

The long-term cure is to remove, disassemble and clean the starter. This is pretty straightforward operation.

First, remove the battery ground and positive cables - IN THAT ORDER - and remove the battery (it's been a while, so I'm not sure if it's required that the battery come out for clearance purposes, but it will make your job easier). Remove the cable from the starter.

Remove the two socket head capscrews retaining the starter and pull the starter to the rear to remove it. It's a tight fit into the bellhousing, with an O-ring, so rotating it slightly about the shaft axis will help you "wiggle" it out.

Next, you need to disassemble the starter.

There are two long screws (or three?) which go from one end cap to the other. Mark the position of the two end caps relative to the stator body (I use a scribe to scratch a line across the mating surface).

Remove both screws and carefully pull the drive end cap from the starter body (that's the end with the gear). Note the presence and number of any shims installed there - they must be put back!

Now you can pull the brush end cap off and remove the rotor from the stator. It's kinda tough to do, as there are some fairly powerful magnets in the stator which pull the rotor to one side. Just slide it out.

Clean the dickens out of everything, using a cleaner which will NOT leave a residue (some "contact cleaners" will leave gunk behind). Brake cleaner is one of my favorites.

Inspect the rotor contacts and the brushes. I think the minimum brush length is about 1/4" (memory fails me here, that's probably wrong). At any rate, the odds that the brushes are worn out is somewhere between slim and none, so don't sweat it too much.

Assembly is the reverse of disassembly. I insert the rotor into the stator and then install the brush end cap, aligning it with the marks I made earlier. Finally, install the shims and the drive end cap, align to your marks and install the long screws.

Install the starter and battery, hook up your cables and you're set!

Starter Electrical Problems

By Richard Meltz
April 1998

Yes I can explain this and it's a very obscure aspect of the bike's wiring system. Here's how the Hall Effect Sensor can affect starter function. I'll try to do this by memory, as my notes on this work are back at the shop, so I won't include wiring colors for now.

Consider the starter relay. Like all relays, it has two "sides". Some people call them master and slave, others call them control side and controlled (past tense) side. The controlled side takes the high amperage input current from the battery and sends it to the starter whenever the relay is activated. The control side activates the relay. It's this circuit, the starter relay control side, that we need to consider.

The control side needs a power source and a ground. When the ground side is connected to a good ground, and the power side is "hot", the relay will click on and send power thru the controlled side to the starter.

OK so far? Let's continue. The control side power source is the starter button. When the key is on and you hit the starter button, electricity flows to the power side of the starter. But the relay still won't activate unless the ground connection is also good. Here's where the problem comes in.

You'd think the ground side of the relay would be wired directly to a chassis ground, as it is on many machines, but this is not the case on the K100. In fact the ground is provided thru the ignition brain and on thru the HES!!!! That's why an intermittent HES problem causes on-off-on-off starter operation with the starter button held down.

You can easily prove this point to yourself, but only if the bike will conveniently stay "dead" long enuf for you to conduct this test. Intermittent problems are always a pain to diagnose and work on cause they always seem to spring back to life just when you're closing in on them. Anyway, here's what you do. Identify the starter relay control side ground wire. Splice a new wire into it and run it directly to a chassis ground. The intermittent starter operation will now disappear! Of course, the bike will still cut out on you from time to time because the HES still has a problem. It just won't affect the starter circuit anymore.

When I figured all this out I was initially baffled by the seemingly unconnected symptoms: The bike would cutout and the starter function would get weird. Then it would all go back to normal. My attempts to solve the problem were hampered by the bike returning to normal. Ya can't fix it if it ain't broke. I got lucky, if a dead bike can be called lucky. The bike died on me and stayed dead. I had to call my wife to come get me in the pickup truck, but when I got the bike back to the shop, and it continued to play dead, I was able to discover the lack of ground at the starter relay control circuit. This breakthrough ultimately led to my diagnosis of the problem.

If this information can help you, half a world away, I will really be happy. It was a very satisfying mental challenge working this all out for myself, and the problem is so obscure, that it's not been published elsewhere. Aren't the Internet and this list great?

Starter Mechanical Problem

By Niel Manson
January 2001

I had an intermittent problem with my 1988 K100LT starter for the longest time. Starter would not crank with a good battery. I assumed that this was a battery/alternator failure. Took it to dealer and described problem. Dealer could not duplicate problem so did not do anything. When time came to drive home, I had to jump start it because it would not crank. Sounded like somebody was holding the starter from turning with a big screwdriver.

I gave up on the dealer and decided to tackle the problem myself. Found the problem the minute I removed the starter. When I pulled the Core out of the housing, one of the 4 magnets came out with it. Seems that the magnet had just enough room to move so that it would occasionally jam the starter and keep it from rotating. Any jiggle to the bike would move the errant piece just enough that the starter would work again. I replaced the whole starter with a used one and have had NO problems since. The glue holding the magnet apparently failed and allowed it to "float" about. I believe that a similar problem was mentioned in MOA but I thought perhaps you would want to post this in your wonderful site as well.

Niel Manson

p.s. I just took a 250 mile ride on a brand new Russell "Day-Long". Everything I have ever heard about them is true. I experienced absolutely no discomfort in the posterior region.
..............I Believe!

Starter Relay Failure

By Tom Coradeschi

The battery in my K100RS went dead the other day. I tried to start the bike, but it wouldn't catch. The problem is that when I jumpstarted it (installed a new battery in it) the starter kept running and running until I disconnected the battery cable. When I reconnect it, the starter begins running again.

HELP!

What you describe is a common, or fairly so, symptom of trying to start a K-Bike when the battery is not fully charged.

Pretty much what happens is this:

1. The battery is low on charge, but is not totally dead.
2. The low voltage condition of the battery means that it does not fully pull the starter relay contacts closed.
3. Once the relay contacts close (however little they might), the remaining energy in the battery gets dumped to the starter.
4. Your choice of:
    a. The low contact pressure and the high current through them combine to cause the contacts to become very hot and to weld themselves together.
    b. The low contact pressure, combined with the high starter current (which then lowers the system voltage even more), which results in the contacts bouncing open and closed. The resulting arcing causes the contacts to become very hot and to weld themselves together.

Either way, pretty much the only fix (you can try to pull the relay and repair it) is to replace the starter relay. It's found in the electrical box, under the fuel tank. Refer to Paul Glaves' tech note to identify the specific relay for your bike.

Hope this helps...

tom c

Starter Relay Problems

By Patrick Barney
September 2000

I have experienced several problems with the starter relay contacts welding on my '85 K100RT. I had this re-occur several times and finally took the bike to the BMW dealer. After a month I got the bike back and they said it was a faulty ignition switch. Two days later, I welded the contacts again. Now really peeved with the dealer, I pulled out the schematic and traced down the problem.

I found the clutch interlock switch when closed had approximately 15 ohms of resistance across it. This in series with the starter relay coil caused a voltage drop across the relay coil much like a low battery voltage. It was a $16 fix. Needless to say the dealer was a little red-faced.

In a pinch, if the the contacts have welded, try rapping on the relay with a screwdriver handle several times. I've able to break the contacts loose this way.

Hope this helps,
pjb

K1100 Sidestand Switch Bypass

By Bruce Keahey
January 2001

As one who has in the past repaired far too many butchered wiring harnesses, here's how to bypass/ eliminate the K1100 sidestand engine kill switch either temporarily or permanently, without altering or damaging the wiring harness.

Get BMW part P/N 61-12-1-459-998, called a "contact ring". It's actually a jumper encased in a specially designed connector that plugs into the harness, substituting for the sidestand cutout switch. It enables the engine to run while the bike is on the sidestand for diagnosis/repair. Makes defeating the sidestand switch a one minute operation, and it's completely reversible.

I keep one on the bike, zip-tied to the regular harness wire, just in case my sidestand switch fails on the road. Just remove the right side cover, unplug the sidestand switch, plug in the jumper plug, replace the side cover, start the bike, resume your ride.

At about $12, the plug may seem a little pricey, but it's worth the price in convenience and wiring harness damage avoidance.

The question has been asked whether it will fit oilheads. I haven't checked, but a simple way to find out would be to park a K-bike and an oilhead side-by-side, unplug their sidestand cutout switch connectors and compare. Since the jumper plug simply replaces the part of the connector to which the sidestand switch is wired, if the connectors are identical, then the jumper plug fits both bikes.

A word of caution: Because this plug is normally for "Dealers only", when you order it, don't you talk too much about what its purpose is or why you want it. If you do you may set off the dealer's liability/ litigation alarms and encounter resistance/refusal to sell it to you. Better just find a not-too-knowledgeable parts counter person, and simply order it by the above number.

Bruce Keahey

Cleaning the K Bike Ignition Switch

By Bill Wagaman

The following is the procedure I used to clean the ignition switch on my 1988 K75C. I do not know if the ignition switches for the R series are the same but I would expect them to be similar.

Symptoms: Engine would all of a sudden die. Gauges looked like the ignition key was turned off. Wiggling the key in the on position would bring the bike to life. Sometimes get dim charging light at idle.

The switch: The ignition switch on the K bike is a switch unit with a 18" long or so connector wire. The connector part is under the fuel tank. The procedure is to remove the switch from the switch pad, disconnect the connector under the tank, disassemble and clean the switch, reinstall.

PROCEDURE

1. Disconnect negative lead to battery.
2. Unbolt the switch pod which houses the ignition switch.
3. Remove fuel tank, wiggle the wire from the ignition switch and follow the wire to the connector near the center frame. Disconnect the connector, cut the wire tie near the head tube and pull out the wire.
4. Remove the circular switch bezel around the switch with a small screwdriver. You will see 2 rectangular openings at 3 and 9 o'clock next to the switch. Insert a screwdriver in each hole and release the switch. Push the switch backwards and out of the switch pod.
5. You should now have the ignition switch complete with pigtail ready for surgery.
6. Remove the rear plastic guard. This somewhat protects the rear of the switch, wiring end. I would highly recommend marking the length of the switch with a marker at this time to ease reconstruction.
7. The switch is divided into 2 halves. The front half is the lock part, the rear half has the switching part. To remove the rear part of the switch from the front half is simple. There is a small recessed screw I believe at about 12 o'clock on the switch. Look for a bit of red paint on the outside of the switch. The paint is there to somewhat lock in the set screw. Use a small screwdriver and back out the set screw so that it almost falls out. The rear half of the switch should now come away from the front half. Put the front half of the switch to the side.
8. If you look carefully at the back switch half you will see it is kind of a sandwich of gray, white, gray plastic. You want to remove the gray plastic section closest to the wiring. Insert a small screwdriver near two locking tabs on the gray section. This will release the gray plastic section, exposing the switch contacts.**[See Ignition Switch Disassembly" for additional details - wd]**
9. In the switch section you will see several short springs, a triangular brass colored piece, a long 2 prong contact piece. Either make a drawing of how things fit together or remember how they go together. I do not think that you can put the switch back together wrong, it is easier to reassemble if you remember where everything goes.
10. The first thing I checked were the center electrodes. They were coated with a loose black deposit in my switch. They look like a set of points. I polished up the these contacts with some metal polish. Mine was slightly pitted, but they polished up real bright and silvery. I then cleaned out the residual dirt in the rest of the switch. Then I polished all other contacts.
11. I put some dielectric grease on all the contacts. I lined up all the parts in the order that I

remembered and snapped the back gray half back onto the back half of the switch. I then inserted the front half of the switch, reset the set screw.

12. I would recommend at this time reconnecting the ignition switch and the battery before reinstalling the switch into the switch pad. I connected the switch and battery and tried it out. Everything should turn on as before. If all is well, disconnect the battery and switch. Put a little dab of paint on the external set screw.You then basically reinstall the switch by reversing the first 4 steps.

I feel that cleaning up the switch and especially putting some dielectric grease on the contacts should get you an almost new switch.

Headlight (Hi-Lo) Switch Repair

By Don Eilenberger
April 1998

Folks - I know we've beaten it almost to death, butt - a few notes on an experiment I performed this weekend on my K100RT ('85).

As some may remember, I was running an 80/100 bulb in the K in the attempt to get more light where I need it.

I recently removed the 80/100 and found the inside of the envelope (bulb) had deposits on it - indicating to me that it was running at a lower voltage than designed for (halogen bulbs are designed to run so hot that the normal filament deposits are evaporated off the inside of the envelope back onto the filament).

Another thing I'd noticed lately is that my hi-low switch was developing a dead spot when switching from high to low or low to high. It also was stiffer to use than I'd remembered.

Figuring the switch was about to do a meltdown, I decided I had nothing much to loose by taking it apart and looking to see if I could find what was wrong. Or starting to go wrong.

CAVEATS: Don't do this in the driveway (BTDT-WDIA). Don't do it if you're a klutz with tiny parts. Don't do it if your switch is OK - it might not be when you're done.

I unscrewed the switch from the handgrip (while parked in the driveway), unclipped the tie-wraps holding the cable in place, and put it up on my tankbag for dissection.

There are LOTS of little phillips (+) screws holding things together in the light switch. So I grabbed my magnetic parts holder thingie, and put it on the tankbag next to the switch.

It became obvious to me - that to take the actual switch outta the housing, first the plastic plate holding the wires in place gotta be removed (three screws - one of a different length). And then the horn and turn signal buttons gotta come off (more little screws).

CAVEAT: The horn button has behind it - a tiny spring AND a funny brass piece - which is not magnetic - and WILL jump right outta there onto the driveway (BTDT). Takes a while to find (BTDT), and the horn button only will work if it's put back in (BTDT) the right way (BTDT). IF not installed, or not installed the right way - you have a permanent ON horn button (BTDT) which will annoy the neighbors as soon as you turn the ignition on (BTDT).

After removal of these two buttons, and 3 more screws (again, different length screws) - you can remove the switch from the housing and examine it.

Mine didn't look 'bad' - but operating it - I could see the contacts which switch the hi/lo. And they were gunked up with dirt. Black sorta dirt.

I used some flammable/carcinogenic/bad-stuff electrical cleaner on the end of a rag with a tiny screwdriver inside it to clean them. I found it necessary to operate the switch lots of times before they started staying clean.

Note - they are barely visible when you switch the switch, but if you look REAL closely - you can see them - they're little round lumps that a wiper assembly rubs over.

This - I hoped - would clear up the dead spot, butt the switch itself was still stiff to operate.

I looked some more, and found that there are two tiny ball-bearings that are prolly spring loaded, which move in/out of several holes and a slot. These provide the detent for hi/lo, and the spring loaded return for the hi-beam flash function.

I tried spritzing (tech-term) some WD-40 on these - with little effect. So I got out my moly-lube (left over from spline stuff), and poked some into the holes with a toothpick as I operated the switch back and forth.

I also lubricated the contact area with a non-greasy lubricant (LPS) made for this sort of application (at least it sez so on the can).

Much smoother now.

Reassembly went OK, until I started looking for the brass piece for the horn button (which I found in a rag I used to protect the tank), and until the tiny - special - screw holding the horn button went flying. Finally found a replacement for it down in my cellar junk-screw-bin. (It is a VERY special screw - don't lose it!).

Turned the ignition on and found:

1. No dead spot
2. Regular (55/60) headlight bulb appeared brighter than the 80/100 had
3. Much smoother operation
4. Horn blowing continuously - had the brass thingie in backwards.

Conclusions:

The interior of the switch had obvious road-dirt in it - the bike is 12-13 years old, has obviously been in the rain (rain trails inside the switch), butt - the contacts, once cleaned looked FINE, and all wiring was fine (no solder melting).

I seem to remember some other prez's dissecting their failed switches and finding that the soldered connections to the contacts had failed, indicating to me that there was an AWFUL lotta heat - prolly caused by dirty contacts (resistance) heating up enough to melt the solder. The accumulation of road-dirt could cause this sort of high-resistance failure. The switch is NOT well weather sealed (surprise!), and there is no obvious way to seal it - but a seal where on the joint on the top where it attaches to the handgrip would help a LOT (gonna use some sealant on this - real soon now), since most of the rain marks looked like they came down from this joint.

My advice - don't do this in the driveway - and I'll prolly do it on a semi-annual basis. A trick I learned when rebuilding sailboat winches is to do this sorta thing inside a shoebox - the parts then only have one way to jump out (up) so the chances of retaining all of them is much higher - gonna do it this way next time. If you are seeing what appears to be (a) less light out front (b) stiff or notchy operation (c) a dead spot - you MAY be able to rescue your switch before total failure occurs. If not - you need a new one anyway, so nothing ventured nothing gained.

If any prez's have dead switches laying around - I'd be interested in dissecting a few to see what failure modes I find, or hearing from people who have opened up the failed switches. Plus - if you send it to me, I'll have spares for all those little screws/balls/springs that tend to go flying. EMail me for my address if you'd like to donate dead switches to the cause. I'll summarize what I find and post it.

Headlight Switch Repair - Addendum

By Leo Horishny
September 1998

I'd like to expand on Don Eilenberger's helpful dissection of the K bike headlight switch. My story looks like I'm heading towards a switch replacement, but after my light wiggled off last night coming home, I was prompted to follow his instructions and take my switch apart hoping I could clean and repair my switch.

2 prep items I added to his, I laid a couple of large light colored towels on the ground under the area to highlight and capture any rogue parts that I might miss, and I used a couple of largish floppy magnets to hold my screws in roughly the same pattern as they came out of the switch. Including the spring that rests on top of the horn button screw and is between the handlebar and the switch. I didn't have a brass piece he describes with THIS outer spring, HOWEVER, when you take the button off the switch, there is another spring inside the button itself and in THAT spring there's an infamous brass thingy. As you unscrew the horn button from the switch, you should be able to allow the button to fall into your palm, with the spring and the brass piece staying put in their stem.

I can attest and aver that the horn will sound if you forget to replace the spring that rests atop the horn button securing screw between the handlebar and the switch casing when you screw the switch back onto the handlebar!

When you get to the light switch itself be aware: There will be 3 springs to control when you take the switch out of its housing. 2 are on the right side of the switch (with switch oriented as it's supposed to sit) and 1 is on the left side. The ones on the right are behind the brass contacts for the lights, the one on the left is behind the upper ball bearing pivot Don describes. BE CAREFUL as you remove the pivot the switch button rotates on; as you take the pivot out, look and plan where you're going to place your fingers to secure the springs as you re- move the switch.

As he describes, Your Outcome May Vary as to whether this will cure your woes, but it was a pretty straightforward operation using reasonable caution.

Headlight Switch Repair - Addendum II

By: Chris Bell
October 1999

I just did a headlight hi/lo switch repair using Don E's repair FAQ. After conversing with him about some discoveries, he suggested submitting this to supplement the original FAQ.

Ideally this job would be done after removing the gas tank and unplugging the entire switch from the wiring harness so it could be cleaned and repaired on a suitable table. However it can be done as Don and I did ours, with the plug end of the switch still connected somewhere underneath the gas tank. I used a magnetic bowl purchased at a tool store to hold most of the parts and laid a light colored bath towel across the tank and inside the fairing to catch anything I dropped. (WARNING: somehow secure the towel or do this in the garage or else a breeze can send all these important little pieces flying!)

My switch was dirty but that was not the only problem. When the problem originally surfaced, my low beam worked but not the high. When I started working on it Saturday everything had reversed, the high beam would work but the low beam had now failed. It turns out one of the solder contact "blobs" in the switch broke off and was rattling around inside the switch at first allowing the low beam to work, and later the high beam only.

After cleaning, I was able to attach a new "blob" of solder in place of the old one so the light is functioning fine now. I went to the BMW shop and ordered a replacement switch for $69 which will ensure that my repair will last FOREVER. (Law of Spare Parts - if you have replacement parts handy, you will never need them).

Here are some additions to President Eilenberger's repair instructions:

1. For cleaning, the switch can easily be taken apart further than Don explained in the FAQ. Once the switch is disassembled as far as described, the hinge pin that holds the hi/lo rocker can easily be pushed out with a very small screwdriver or nail. The button part and the *many* springs, pins and contact plates in it can then be fully removed from the switch "frame" that still has all the wires soldered to it. This allows full access for cleaning all the little parts and contacts. Separate the rocker button from the frame slowly so you can identify where all the parts go during re-assembly. (It is possible to hold all the parts in place with your fingers during the separation.)
2. The detent "ball-bearings" that can be lubed with a toothpick and grease are in fact spring loaded pins similar to the "funny brass" thingie that goes in the horn button. They can be cleaned and lubed after disassembly.
3. Access to the screw that holds the horn button in place is buried deep in the back of the whole switch assembly. You can get a straighter shot at that screw with your screwdriver if you depress and hold the horn button while undoing and replacing the screw.
4. The brass thingie that causes the horn to operate continuously if installed improperly: I would describe it as a pin with a collar located not quite in the middle. The shorter end of the pin goes into the spring that goes into the hole on the back of the horn button. The longer end of the pin goes into the "guts" of the switch.

As I said, after complete disassembly, I was able to heat the connection that had crumbled in my switch with a soldering iron and reconstruct the failed contact. When finished, I cleaned everything thoroughly with contact cleaner and re-assembled the switch. Before I installed it, I doused the insides and back of the whole thing pretty good with an aerosol silicone spray that will act as a lube and protect the contacts

Ignition Switch Disassembly

From: stuartj@actrix.gen.nz (Stuart Scott)
Subject: BMW: Re: K bike ignition switches
Date: Sat, 01 Apr 1995 11:45:02 -0500

Tom Coradeschi, having trouble with his ignition switch asked...

> Any ideas/suggestions on how to separate the lock cylinder from the
> switch proper? It looks like the whole mess fits into a plastic sleeve.
> Needless to say, I'm a bit fearful of forcing the thing and buggering it
> all up.
>
> I just KNOW somebody out there can help me!

After removing the plastic endcap, the switch gear is contained in a plastic barrel unit. The unit is held in place by two pawl like clips:

```
                      key end
                    |           |
                    |\         /|  <- PRIZE THESE
   PAWLS ->         |_\       /_|     out
                    ||         ||
                    ||         ||
                    ~           ~
                     switch end
```

located on the sides of the barrel unit.

Prize these apart (simUltaneously) and drop the switch unit barrel off the bottom of the unit.

From memory, there are two bridge units (90 degrees apart) held in with small coil springs, so put a rag unit the barrel to catch them on dis-assembly.

The guts of the unit looks like this (side view).

```
                 |  key barrel |
                 |             |
                 |             |
                 |{___|___|___}| <- CONTACTOR POLES
                   ^
                   | BRIDGE PIECE
```

Clean the outer edges of the bridge piece and contactor poles with fine emery or abrasive paste.

Assembly is the reverse of dis-assembly (I love that phrase!)

I find the symptoms of dirty contactors are;

1. Intermittent missing

2. Brake warning like comes on after a `miss', indicating the ignition has been momentarily interrupted
3. Faintly glowing ignition light

and do this routine about once every 18 months.

Hope this helps,

Stuart

PS Never believe them when they say `NO USER SERVICEABLE PARTS INSIDE'

==
Stuart Scott Ph +64 4 472 8443
Coastal Tankers Ltd Fax 473 3690
Wellington, New Zealand Pvt 386 1590
Email: stuartj@actrix.gen.nz
President, Internet BMW Riders 1984 BMW K100
"...two cams, some valves, no turbo..."
==

Throttle Cable Adjustment - 85 K-Bikes

By Tom Coradeschi
July 1994

Brian Brumfield wrote:
>> Clymers says to simply twist the little throttle cable adjustment
>> nut/screw/thingy by where the cable exits the right hand switch "pod."
>> Great, except on my bike, there isn't a little adjustment critter. Hmm...
>>
>> I'm barely able to see what *might* be an adjustment nut on the other end
>> of the cable where it attaches to the FI. However, I would really like to
>> know that that's what I should be messing with before I remove 75 pieces of
>> plastic and the gas tank. Is the answer "buy a new cable"?

> I had to remove the cover next to the grip (the large phillips-head
> screw just to the left of the grip) and then reposition where the
> teeth mesh on the grip and the cable-puller assembly, reinstall the
> cover and voila.
>
> I had to play with it a couple times to get it right, but it did the
> trick.

But you don't have to do that. On '85 K100 models, the adjuster is in the middle of the cable (well not really the middle, but 10 - 12" from the handgrip). Look for a lump of rubber in the cable and pull it back. There's your adjuster! Inside the handgrip, the scribed line on the grip and the line on the pinion gear should be aligned when the throttle is closed.

tom coradeschi <+> tcora@skylands.ibmwr.org

By Rob Lentini <roblentini@cox.net>
'87 K75S
Tucson, AZ
K Whiner MC#11

First of all, are you having problems with your bike? The only reason that you should really have to go into the air flow meter is to correct for relaxation of the return-to-zero spring inside. With age, its preload weakens resulting in a richer mixture that can manifest itself by black sooty smoke from the exhaust.

To determine the meter's condition, you will need access to an exhaust gas analyzer. If you don't have one, maybe your dealer will do the check for you.

Anyway, with the bike thoroughly warmed up, and a large fan blowing at the radiator, measure CO at idle and at the first and second detent of the "choke" lever. You're looking for about 2-2.35% at idle, and 1-1.5% at the higher speeds. Really lean mixtures may cause backfiring on trailing throttle. Be advised that a too-rich mixture at idle will affect, to some extent, higher rpm readings, so set the air bypass adjustment screw on the top of the air box (under the rubber cap) for 2-2.35% first.

If cruise CO is too rich, remove the top section of the air box from the motorcycle. Now carefully remove the meter from the airbox (careful with the connector!) and carefully, VERY carefully pry off the black plastic cover over the potentiometer assembly. Now install the meter to the injector plenum by removing the snorkel from the airbox and connecting it directly to the meter and then to the plenum. This will enable you to run the bike and adjust the mixture in real time.

Look at the potentiometer assembly. You will notice a toothed adjuster wheel that controls spring tension. It is held in place by a metal clip. You should be able to gently raise the end of the clip off the teeth to turn the wheel. Turning the wheel CW from the top will lean the mixture, and vice versa.

Running the engine with the open potentiometer and at the fastest position of the "choke", change the wheel to achieve 1-1.5% CO. Only move the wheel one tooth at a time, and remember WHERE you started from!

Once satisfied with the CO reading, and seeing no sooty smoke when you blip the throttle, you are done. Remove the meter and delicately clean the carbon resisitive element that the wiper runs on with a Q-tip and alcohol. Make sure there is no crap inside the chamber by gently blowing it clean with a camera blower/brush. Reseal the cover to the meter using BMW Drei Bond silicone ONLY. Other types will leave acid fumes inside, possibly corroding delicate parts. Let the meter cure overnight and reinstall. You may need to reset the idle CO more lean after installation, due to whatever slight airbox restriction exists.

So, that's it! You will be rewarded by better throttle response, fuel economy, lower emissions, and maybe even better power. Just use EXTREME care when doing all this. The meter costs about $800!!!

Backfire

Date: Thu, 28 Sep 1995 12:27:11 -0400
From: Rob Lentini <roblentini@cox.net>

Ed Guzman is asking how to fix K backfiring:

Here's an [edited - wd] earlier post, friend...

Rob Lentini
'87 K75S
Tucson, AZ
K Whiner MC#11
---------------------- [Original [edited - wd] Message] ----------------------
Don,

Major backfiring is NOT acceptable, though some is inherent. Have your dealer check the fuel/air ratio at idle, throttle body synchronization, and the throttle switch adjustment. You may also have too little throttle cable "play" which may be holding the butterflies slightly off idle, keeping the throttle switch actuated. Check for a audible "click" at the injector area as you slowly ease off the twistgrip to idle. If the switch is incorrectly adjusted or the throttle cable too tight, you won't hear the "click", and the engine will receive fuel as you decelerate, causing backfiring.

Rob Lentini
87 K75S
Tucson, AZ

Date: Thu, 26 Oct 1995 20:11:20 -0400
From: PGlaves@aol.com

In a message dated 95-10-26 06:49:33 EDT, Jim Olin writes:

>Also, it backfires when I let up on the throttle. Is this an indication of a
>serious problem?

The problem is almost certainly a mis-adjusted throttle cut-off switch - located on the rearmost end of the throttle plate shaft assembly - left side of engine, just ahead of the coils. This switch is supposed to close - with a faint click - just as the throttle closes completely. This signals the ECU to cut the fuel flow to the injectors if RPM is over 2000. If it is mis-adjusted so it doesn't close (and click), then the injectors keep pumping in fuel even on throttle off conditions. This will cause the backfire. The switch is adjustable by loosening two screws and slightly rotating the entire switch assembly. Set this correctly and most of the K bike backfiring will go away.

And BTW, use the Clymer manual with confidence. There are very few (if any) significant changes between a '89 and '90 K75.

Paul aka Dr. Sprocket

How To Replace the Fuel Filter

Date: Mon, 14 Aug 1995 19:03:10 -0800
To: walt@diu.cms.udel.edu
From: boba@asi.com (Bob Anundson)

Changing the K75 Fuel Filter

This procedure is fairly simple and straight forward but is not mentioned in Clymers specifically so I thought I would pass on my experiences.

The first step is to remove the gas cap assembly. There are four screws holding on the assembly and once removed the assembly comes off quite easily. At this point I siphoned off the remaining gas into a portable tank and I recommend everyone do this if possible.

Inside the tank on the left center side the front half of the filter can be seen. A small piece of hose attaches the filter to the pipe carrying gas to the injectors (the pipe is on the bottom of the tank). This hose is held into place on the pipe by a small clamp which can be loosen by a screw driver. After loosening clamp screw, the hose can be slid off the pipe and filter can be brought up through the tank opening.

The other end of the filter is attached to a hose that is attached to the fuel pump. Note the direction of the arrow on the filter is towards the end that attaches to the pipe going to the injectors (the first hose that was removed). The filter can be removed by loosening the bracket on the hose connects to the fuel pump and the small piece of hose on the other end is similarly removed. Be careful as the filter is full of gas which is best directed into the tank and not on it.

Reverse the process for installing the new filter.

BMW recommends to change the filter every 16,000 under normal conditions. I changed mine at 13,000. Last year I replaced two fuel pumps on cars because of clogged filters and it was real expensive ($700 for the two). Therefore I am willing to spend a little more and change the filters more often hoping in the long run it will be cheaper.

I kept the old filter as an emergency backup for the road. There are stations with bad gas out there and an extra filter could come in handy.

Bob Anundson, K75

FI Fuel Pressure Tester

By: Clarence Dold

Don mentions "special tools". The special tool that I used was an engine compression gauge. Mine was the really cheap kind. A dial with a stubby metal tube. The metal tube has a rubber sleeve on it. You jam the gauge against a spark plug hole and watch.

To use it to measure rotary engine compression (Oh, no, that's a $600 tool), I took the Schraeder valve out of the end of the tube, so it would release the reading, allowing the odd triple chamber rotary to show its true compression.

To use it to measure K-bike fuel pressure, I pulled the rubber thing off. This left me with a 3/8" metal pipe coming out of the gauge. I had a metal tee left over from something. I used the tee and a couple of chunks of "normal" fuel line to tee this gauge in, at the aft end of the fuel rail, where the hose feeds to the regulator.

Hitting the starter switch should cause the pressure to kick up to 60 psi. When the engine starts, vacuum control on the regulator will pull the pressure down to 40 psi. Turning the engine off should leave you with 40 psi. How long you wait for it to leak down wasn't mentioned. Mine was still at 40 psi 30 minutes after I shut the engine off.

If you disconnect the vacuum hose that controls the regulator (mine comes off the rear throttle body), the pressure would go up to 60 psi. Applying some vacuum to this line (I sucked on it) should drop it down. I can get the pressure down to about 30 psi. This portion of the test might be performed while the engine is running, or by "bumping" the starter switch, which lets the fuel pump run for a few seconds.

When my regulator was bad, it would stay at 60 psi. The vacuum line had no control at all. Even at 60 psi, the injectors didn't leak. I let it sit for several minutes. The "normal" fuel hoses that I was using would swell noticeably at the 60 psi range, so it would probably be wise to use some FI-rated hoses instead.

The compression gauge isn't expected to be accurate in this pressure range, but I was looking for go/no-go, not tuning help.

With the engine running and the pressure stuck at 60, the bike actually ran most of the time. It was hard to start, but if I could get it started, and keep the RPM up, it was usable. And this was on a K75, with no feedback in the FI system. A K12, with feedback, might well adjust the injection to accommodate the high fuel delivery, but the injectors might leak down when stopped, dumping some fuel into places you don't want it.

Fuel Problems & Port Fuel Injection

By Larry Cann
August 1995

In many ways the problems caused by gasoline stem from the fact that fuel metering systems (LE-Jetronic and Motronic) are incredible precise when compared to carburetors. As a result, these systems are more sensitive too and easily affected by deposit formation.

In 1985, problems first arouse with Port Fuel Injection (PFI) fouling. Note, the BMW motorcycle LE-Jetronic and Motronic systems are both PFI. The assumption at the time was that gasoline additives which had been increasing in popularity, were the problem. However, the problem was more complex than just the additives themselves.

Research has shown that several conditions contribute to injector fouling and that some of these conditions are in fact more serious than the additives. Specifically, injector design, driving pattern, fuel seepage and temperature.

The pintle type injectors used in BMW's motorcycles are prone to deposit formation. The flow control pintle in this style injector is manufactured to very exact tolerance. The metering orifice is approximately 0.002 inch and the pintle provides a surface for deposits. Deposits themselves, form during the hot soak period immediately after the engine is shut off. Therefore, a motorcycle used primarily for short trips would be more susceptible to this type of deposit formation. Fuel leaking past the pintle during hot soak, will increase the rate at which deposits form. Increases in temperature, will also increase deposit formation.

Early on, manufacturers encouraged oil companies to include cleaners in their fuel for PFI. Most responded and the problem is not as severe today. However, the problem has not gone away. Note that as little as a 10% reduction in flow of any injector can result in drivability problems. These problems include uneven idle, reduced power, poor fuel economy, hard starting and even stalling.

In addition to injector deposits, we have to consider Intake Valve Deposits (IVD). Valve deposits have always been present in engines. In older engines, they were the result of oil, soft and gummy. Today's engines are built to tighter tolerances and the valves are exposed to less oil. In addition, PFI introduces fuel directly ahead of the intake valves. As a result, valve deposits are more fuel related and much harder.

IVD's affect the flow characteristics of the air/fuel mixture robbing power. They also absorb fuel on startup until they become saturated. As a result, these deposits can cause a lean condition during motorcycle warm up. As with injector deposits, short trips also contribute to this type of deposit formation.

Fuel composition and detergent chemistry play a key role in IVD formation. BMW developed the first test to rate fuels and their affect on IVD formation. The "BMW Cleanliness Test" is used by several companies to certify the cleanliness of their fuels. Work is currently under way to develop a comprehensive series of industry standard tests for fuel cleanliness certification.

Concerns about deposits have become so prevalent that some manufacturers have again developed recommended fuel lists. Using a gasoline with effective deposit control additives should keep intake valves clean under nearly all driving conditions. Most oil companies advertise the benefits of such fuels:

"passed the BMW unlimited mileage test" or
"keeps intake valves clean" or
"provide total induction system cleanliness."

Look for fuels that make these statements. If you can't find these fuels, you can buy additives such as Techron and add it to your fuel.

Larry Cann
BMW of Orlando
Phone (407) 826-4BMW
FAX (407) 856-0568
Tue-Sat, 1st & 3rd Sun

Please feel free to reprint this article. I would appreciate a copy of any reprints be sent to the following address, thanks.

BMW of Orlando
9500 Satellite Blvd., #120
Orlando, FL 32837

Gas Tank Leak Problem Solving

By Philip Whitton
November 2001

I have experienced a problem that I think may be of interest to K100RS owners.

I have a 1985 model European delivery which has only 46,560 km which is all main road touring. When returning from a weekend touring, developed a fuel leak from the base of the tank. In effect it had split around the locating peg.

When I finally got home I examined the area critically and found the rubber grommet had squashed which resulted in the peg coming into contact with the chassis rail. Thus with the weight of a full fuel load and the Bagster tank bag loading up the grommet allowing the peg to push up into the base plate of the tank and therefore developing a crack.

I've spoken to BMW Australia to highlight the problem and its now off to the nearest dealer for resolution.

Intermittent Engine Cutout Problem Solving

By Don Eilenberger
June 2001

Things I would look at (in IMHO increasing order of probability):

1. Coils - look at them in the dark with the bike idling, just to make sure there isn't a crack in the towers that is causing arc-over. Doubtful due to the 2nd clue, but easy and cheap to do.
2. Ignition wires - worth checking the resistance on them. This would be the first place I'd look if we ONLY had clue #1, but #2 can't be accounted for with this. The wires should be 5k Ohms end to end - +/- 500 ohms (they are typically much closer).
3. Poor seating of the FI computer connector. More than one intermittent K bike problem like this has been fixed by reseating the connector on the FI computer. Easy to do, and no cost at all.
4. Ignition switch or kill switch partial failure. Some people have had problems with deposits on the ignition switch causing intermittent running problems, cleaning it is the cure. This is in the K bike FAQ.
5. Starter deposits - given that the bike probably gets quite a bit of use - there have been instances of intermittent problems caused by carbon deposits in the starter motor (BMW does some odd things with electrical paths - that include the starter when it isn't running :-). There is a FAQ on the website on removing and cleaning it. Cost is nil, not really hard to get out once you go at it.
6. Hall Effect sensor - this is where I think the problem is. It sounds like the intermittent failure of a Hall-effect sensor. Have seen and heard of this before here on the list (Jeff Dunkle - would you care to chime in??).

The test for this (Jeff's test) is done with a heat gun (or a really good hair-dryer). The hall-effect sensor assembly lives behind the T shaped cover on the right (facing forwards - starboard :-) side of the engine. The cover is easily removed with allen wrenches.

The test - let the engine idle - and direct the heat gun at the Hall-effect sensor. If it cuts out when it gets good and warm - this is a big clue. Then turn the heat gun to just blowing air and cool it, try restarting. If it restarts, this is the 2nd clue. You may want to do this test a number of times to make certain it's the fault.

This - to me - is the most likely cause - given the symptoms you describe. The hesitation at higher RPMS indicates a weak spark to me, caused by a partially failed HES. The complete cutout indicates complete ignition failure - again, pointing (when combined with the hesitation) to the HES.

This - unfortunately is the most expensive thing to fix, so it's worth going through the other ones first in the hopes that it will be a cheap fix.

Your mechanic is correct - intermittents are a bitch to track down since they never exhibit themselves when you're someplace you can really test things.

HTH,
Don Eilenberger, Spring Lk Hts, NJ JMP#1 deilenberger@monmouth.com
NJ Shore BMW Riders web page: http://www.njsbmwr.org/

Oxygen Sensor Testing

By Nils Powell
January 2001

O2 probes generate a voltage between OV and 1V depending on the O2 content of the exhaust gas surrounding the probe tip compared to the O2 content of the ambient air reaching the element via a vent in the sensor housing.

With a "good" sensor and motor, the voltage reading will swing rapidly between 0V and 1V as the electronics respond to inputs i.e. you will not have a steady reading. This combined with very low signal strength, means measurements can only realistically be made using a digital high impedance multimeter with a bar graph, or using specialised equipment.

Most sensors,including the ones we are talking about, have a Zirconia element that requires a tip temp of around 300C+ to produce a usable signal. This in turn means that probes without a built in heating element require an exhaust gas temp at the probe in excess of that produced at idle power, and to get a valid reading usually a minimum of 2500 RPM is required. - When a heater is built into the probe, which as far as I can tell is the case with all BMW bikes, there will be 4 wires connected to it as opposed to either 1 or 2. Measurements can then be made at lower engine speeds but they do need to be above idle to stabilise results - say 1500 RPM.

With a definite system fault (and a good O2 sensor) an engine running lean will cause the sensor to swing around a relatively low voltage (0.2V) and richness will cause the output voltage to swing high (0.8V) If no faults are present and everything is operating correctly the output will rapidly swing between 0V and 1V. Whilst the actual voltage measurement will fluctuate too rapidly to read consistently and is of no interest, the bar graph will rise and fall observably as will the mean of the swing. Once you have seen this effect on a good sensor it is easily recognised so if you are into this type of diagnostics, test your bike before a fault is suspected to get experience.

Testing - There is NO effective test available to the general workshop with the probe off the vehicle but the sensors are easy to test in situ.

First - The sensor is earthed and referenced to earth via its outer case the exhaust pipe, engine block and battery - this is true even of 2 and 4 wire systems. Check for voltage drops and make sure the probe is secure and the earths are good. Make sure visually that the venting orifice is clear and externally the sensor is clean.

Second - Get the motor up to temp, after a good highish RPM run, and establish a fast idle so that the exhaust gas stream (and heater if fitted) is hot enough to allow the sensor to operate (above say 1500 RPM). Probe the output (backprobing at the first plug up from the sensor is a good spot) and make sure the voltage is rapidly swinging as described.

To test further, create lean and rich conditions:

- Remove an injector lead and see that the voltage swings in the lower 0 to 0.2V range.
- Clamp off the fuel return line A LITTLE to raise rail pressure and ensure the voltage swing rises to the 0.7 to 1V range.

About the only common faults are bad earths, dirt on the sensor body, and age related failure when the output gets sluggish and slows or even stops - this usually takes about 70K miles or longer although failure will be almost immediate if leaded petrol or silicon based sealants have been used where they can reach the probe or combustion process. A sluggish sensor or one that fails to respond to rich and lean conditions instantly, has to be replaced, they are not repairable.

Now to the question of compatibility with aftermarket probes. Never having had to replace a BMW bike O2 sensor I can only describe how I would go about it!

Obviously there has to be a physical fit. Then there is the wiring configuration. Sensors come with 1, 2, 3, 4, and 5 wires. As far as I know all BMW bikes come with a four wire probe and this will not be specific to bikes. Two wires will be to the element heater. Two will be the O2 sensor circuit.

Incidentally the wires from the probe to the first connector will NOT reflect the proper harness colours. All colours are per the harness beyond the first connector which should only be a few inches up from the sensor. If the connector as well as the probe dimensions are compatible it should be safe to try, but easier still is to check the suppliers cross reference chart. It may not contain bike information but if the probe fits, the plug matches, and is usable on BMW cars or other Bosch supplied systems then it should be OK.

As far as I can tell all the bikes use the same sensor with 4 wires coloured as follows.

```
K1100
Gn/W & Br:     Heater
Br & Y:        Sensor (Y = signal)

K1200
Gn/W & Gn/Br:  Heater
Y & Bk:        Sensor (Y = signal)
```

Good luck!

K75S Tank Removal

By: Bryan Lally
August 1995

I need to remove the gas tank to my '92 K75S; however the Haynes manual is less than descriptive for this model. The manual describes two clips at the rear but where else is the thing attached? As far as the hoses go, do I need to watch for anything specific when removing or replacing the tank?

Loosen the hose clamp at the front of the fuel rail and remove the fuel line there. A little fuel will spill out (do it with a cold engine). I stuffed a rag underneath the rail to catch most of it.

Disconnect the electrical connection that comes off the back of the tank and weave the wire attached to the tank around so that it will be free when the back of the tank is raised.

Remove the two clips at the back of the tank that hold the tank down.

Raise the tank from the back, and remove the two lines near the right rear of the tank. Note which one goes where :-) One just pushes on, one has a hose clamp.

Remove the fourth line, way at the left front of the tank. This will be easier if someone else holds the tank up.

Pull the tank slightly back and up, and it is off. It is held on by the two rubber bumpers at the front, and the two clips at the back.

Reverse the steps to put it back on. Make sure you get the rubber bumpers in the right places. As to the two hoses at the back right of the tank, the front tank vent is for the air space in the tank - the heavy hose with the clamp, that leads to the crankcase through a one-way valve (the SHED system) goes on there. The skinny one that goes overboard is for the rear vent - that's connected to the little hole under the gas cap. It drains the area around the gas cap. Don't kink any of the lines, or pinch them between the tank and frame, or bad things will happen.

Additional note:

By: Robert Carter
May 1999

I've found you also need to have a new set of grommets that the rear of tank sits on. Even if lubed up prior to pulling the tank up, they have a tendency to rip. 70 cents for two.

Gas Tank Removal - 1985 K100

By Don Eilenberger
November 1998

To actually remove the tank - you've gotta disconnect the two fuel lines (golf-T's serve very nicely to plug the lines while it's apart - which I'd recommend, and no, gas won't leak out of the unplugged spigots on the tank - but I usually slip a few little pipe-caps over the ends. you want ones about 1/4" ID). and you've got to disconnect the power line to the tank.

All of these are in the forward left side of the tank. and they are easiest accessed by removing the left lower panel on the fairing. which requires:

- Remove left kneepad (two screws up in radio/glovebox, one screw down near your toe.
- K100RT model only: Remove glovebox/or radio box - if you have a radio - see messages on removing it for K1100LT - it's exactly the same. If not - remove glovebox, 4 screws.
- Remove two (mebbe three?) screws that attach lower panel to upper panel - one is right under where the radio box goes.
- Remove two screws from front - these are on the face of the panel surrounding the radiator.
- At this point you'll be able to see the two fuel lines and the electrical plug. Remove as above.
- Remove 10 mm bolt from mounting at rear of tank.
- VERY IMPORTANT - *remove side panels* - these snap into the tank at the front edge - and failure to remove them (BTDT) will break the inside mount for them (BTDT) if a past owner hasn't already broken it. (I now have a sticker right next to the bolt that sez "SIDEPANELS??" - cause I have BTDT. more than once). Note that this design was changed with '86 model year.
- Lift tank up at rear, and slide backwards. it can then be lifted off.

The 4 way connector (why we've done this exercise) is prolly tie-wrapped to the frame. match connectors and start reassembly - which is reverse of disassembly.

OK - cautions - you do NOT want to get any dirt into the FI lines. the lines you're disconnecting are AFTER the fuel-filter in the tank, and dirt getting into them will instantly go to an injector. This is not a good thing.

There may be a bit of fuel spilled - the fuel-rail will be under pressure if you've run the bike in the past hour or so - if you leave it sitting overnight - the pressure should have bled back into the tank. Be prepared with a nice throw-away rag when you loosen the first hose clamp. Alternatively, you can start the bike and unplug the electrical plug. When the fuel pressure goes to zero, the engine will stall.

Inspect your fuel lines - you have a 13-14 year old bike. If they look the least bit doubtful - replace them with FACTORY fuel lines. these are special lines meant to take FI pressure (which in the case of a failed pressure regulator could exceed 60PSI.)

That's about it. it actually took longer to write it out then it should take you to remove the tank.

NOTE to others - the later ('86 and newer) tanks mount differently at the rear - two clips instead of the 10 mm bolt. Other than that the procedure is identical.

BTW - if you just had to slide the tankbag straps under the tank, you could loosen the rear bolt and slide it back a bit and lift up - the back of the tank can be lifted about 4" without disconnecting the fuel-line hoses.

BTW2 - you MAY find that there are two small lines connected to nipples on the right rear side of the tank - these are the overflow line and the tank-vent line. Usually - these are not connected, but are directed at a little funnel arrangement that clips to the frame below them. IF you find they are still connected - I'd suggest getting the funnel thingie. it was a retrofit for early models.

BTW3 - there should be aluminum and fiberglass insulation attached to the bottom of the tank. This was also a retrofit to early models. if you don't have it - it may still be an 'open campaign' and you might just get your dealer to install it for free via reimbursement from BMW.

K-Bike Fuel Flap Removal

From: scot@ccnet.com (Scot Marburger)
Subject: Re: BMW Fuel Gauge
Date: 4 Aug 94 15:14:25 CDT (Thu)

At 10:37 PM 8/3/94 +0000, SteveBMW wrote:
>Regarding his K75, Clarence Dold mentions:
>

>Can you enlighten me as to how you accomplished the bending of the rod?
>How you get to it, how much to bend, etc.?

Clarence will probably reply before this post reaches the net, but he seems overly attached to his tank filler flapper. While you're bending the float rod, you can dispense with the flapper. Here's how:

Remove the filler neck by removing the three or four screws visible under the gas cap. Pull up and out.

Remove the screws holding the bottom portion of the flapper to the filler neck. As I recall, there are three. Retire to a high cliff and toss over your flapper. See how far it goes. That should leave a rather large hole in the filler/cap assembly for you to pour in your gas.

Find the vent line that runs from under the tank to the front top of your crank case. Cut it about an inch above the crank case and plug with an old golf tee or a machine screw. Route the other end (still attached to your tank) overboard so that any gas draining through it doesn't drip on anything important. Leave the other line alone.

If you want to change the place where your gas level light comes on, now's the time. Reach into your tank through the hole and bend the wire arm that runs from the sender unit to the float. It works just like the one in your toilet. Bending the float up lets the light come on later. Since the above modification will let you use at least 4.8 gallons of fuel before running dry (I haven't pressed my luck beyond 4.8 gal.), you may want to set your float so the light comes on at about 4.2 gallons of use. You'll probably have to experiment to find the best setting. BTW, I found the rod very difficult to bend, even though I was able to get BOTH my child sized hands into the tank. So don't worry about over-bending it first time around.

As an aside, I *always* can go *at least* 200 miles on a tank of gas, and have gone as far as 260 miles without running out. That damn idiot light is just about useless as a gas gauge, much better to rely on the odometer. In addition to coming on too early, the light also seems to come on sooner in the winter (maybe because mileage drops with winter fuel blends, or due to lower temperature), or it comes on, goes out, then comes on again. Especially annoying if it stays out after the bike has been parked, only to come on again 20 miles later. Well, am I really out of gas, or is that stupid light just f**king with my head again? YMMV

--
~~~~~~
Scot J. Marburger scot@ccnet.com
"There's No Space Like CyberSpace"
~~~~~~

Rough Idle When Cooling Fan Runs

By Chris Thomson
January 2001

FAULT:

I noticed after some fan maintenance on my '86K75C, the bike would run poorly when the fan automatically activated. The engine would misfire, not a single cylinder miss, but apparent instant ignition source failure, causing the bike to stall in traffic, restart and throttled off idle, engine would run with persistent misfire, until the fan would stop.

REMEDY:

Lifting the tank revealed the ignition source cable (pickups on the front of the engine) would loop around close to the back of the fan motor, then up to the connector and into the ignition control unit. All connectors were checked and cleaned with electrical contact cleaner, and the ignition source cable, routed and secured away from the fan motor and cable. The bike was tested fault free when the fan ran (regular in Bangkok). The following 6 days the bike traveled from Bangkok to Kuala Lumpur in Malaysia and back, covering 3500 km's without fault.

POSSIBLE CAUSE:

LE Jet FI systems source all synch-timing from the ignition unit, hall-effect pickups on the front of the engine. The low level signals present on the pickup leads are cleaned up by the ignition controller, and used for spark timing, a clean synch-pulse sent to the FI computer for injection timing. The leads on my K75C from the pickups to the controller appeared to be unshielded, close proximity to the electrically-noisy fan motor inducing noise on the pickup signal, that couldn't be processed by the ignition controller, causing rough running. NOTE: Japanese cars of the mid 80's using the same ignition/injection system had heavily shielded and grounded cable between the pickups in the distributor body, and the FI computer/ECU.

OF INTEREST, maybe!

Prior to my ride from Bangkok to KL, I had a number of problems to solve. This little '86K had been sitting for approximately 10 years, outside in the tropical elements, unused and unloved, with only 4000 km's on the clock. The bike cleaned up well, and showed remarkable resistance to deterioration over this time. The bike has been used for Bangkok city runs, trips to the North-East etc, bringing the mileage to around 7500 km's before the trip South. During a check of the charging volts, a static run of around 4000 rpm off-load, with lights on for a few minutes had the header pipes glowing red-white. Ambient temperature of approximately 35 degrees Celsius, no wind or breeze around the bike. The engine was running happily, with neutral mixture, and dropped back to a perfect idle. At motorway speed at night, no glow is visible despite the engine being under load, so airflow across the pipes seems the key. As mentioned before, the bike ran without fault for the next 3500 km, delivering good performance, and economy, even in 40+ degree temperatures.

Tech Tips - BMW Owners News [Sometime in 1989 or 90]

By: David Parker 3552 E. Marcus St., Saginaw, MI 48603

Some time back I suggested that those who know how to adjust ignition timing on a K bike using a strobe, should submit an article on the subject. Finally, someone did - Rob Lentini of Tucson Arizona.

To Rob, his technique is simple. To many others, it will seem a bit much. And, since it requires disassembly of the advance mechanism, it may void your warranty. Finally while most strobe lights are connected to the #1 plug wire for timing, this technique requires connecting to the #3 wire.

In other words, this is for serious wrenches only.

After those caveats, let me say that it is relatively simple. This method also will let you re-check and re-adjust timing whenever you wish, and the modification to your timing plate only needs to be done once. Here's the technique:

On all my previous bikes (Hondas) I habitually checked not only static (idle) ignition timing, but also total dynamic advance at high RPM. Total advance is most related to power output, detonation, and should be evaluated in addition to static adjustments. I've seen problems in the workings and calibration of advance systems (mechanical and solid state) that causes me to cross-check static timing and total advance to ensure specifications or desired aims are met. I've also slightly (2-4 degrees) advanced the timing on previous machines up to the point of slight detonation under load. This usually peps up performance across the rev range, and improves fuel consumption.

I wanted to apply my experience to my K75S, but was discouraged by lack of timing marks, and BMW's warnings to leave as is! Well ... I couldn't. Here's how it's done.

Remove the T-shaped timing cover at the front of the engine. This exposes the timing pickup plate, which should be marked with a pencil or scribe between the plate and the crankcase to speed reassembly. Remove the two socket head screws that secure this plate, and remove the assembly. Be careful not to lose the two washers on each socket head screw! Now exposed underneath is a small pot-shaped inductive transmitter, and a top dead center (TDC) plate secured by three small socket head screws. Remove these screws, the transmitter, and the TDC plate. It is the TDC plate we will be accurately marking for total dynamic advance, measurable with a common automotive inductive timing light!

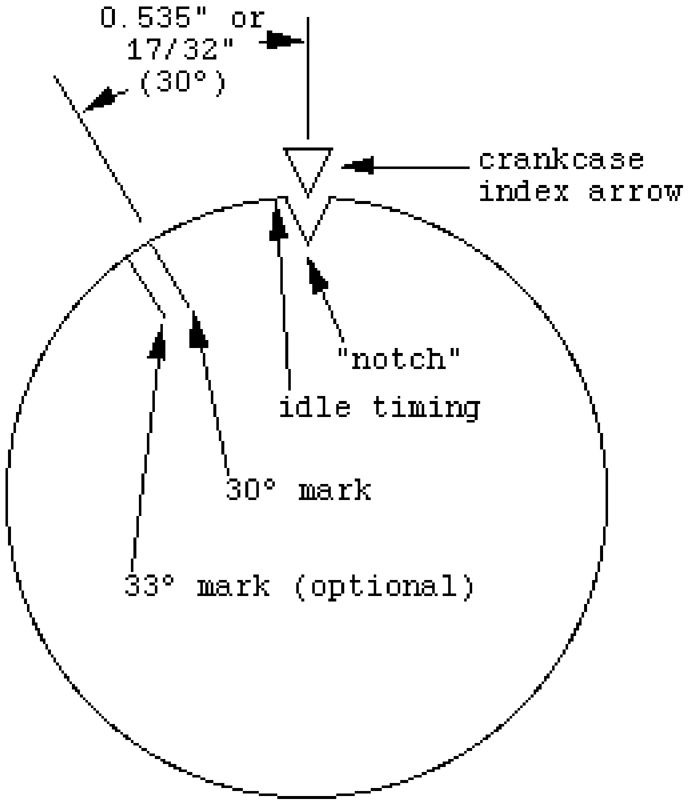
Accurately measure the diameter of the TDC plate mine is 2-3/64 or 2.046 inches. Multiply this diameter by Pi(3.14), arriving at 6.424 inches circumference. Divide this figure by 360 degrees, yielding 0.0178 inches per degree of circumference. The K75/100 has a total specified advance of 30 degrees which multiplied by 0.0178 yields 0.535 inches of TDC plate circumference.

With the front of the TDC plate facing you, accurately measure and mark the plate at 0.535 or 17/32 inches counterclockwise from the center of the TDC "notch". This is now your timing light mark for use with an automotive inductive timing light at full advance at high RPM. You may, as I have, make another mark 3 degrees further advanced at 0.578 or 1 9/32 inches from TDC. I used a small cold chisel to make my marks radially from the TDC plate's center. These are easy to spot with a strobe. Small notches could, alternatively, be filed along the plate perimeter. Your choice.

Now reassemble removed parts in opposite sequence. Install the TDC plate with your marks facing forward. Align the plate with the crankshaft dowel pin. Likewise, install the transmitter and three small socket head screws. Be sure they're adequately tight! Install and index the pickup assembly with the marks you made with pencil or scribe. Loosely secure the assembly with the two socket head screws to allow plate to be rotated during adjustment.

Attach the inductively coupled timing light to the number three plug wire, with the power leads to the bike's battery. Start the engine and allow it to warm. Aim the timing light at the TDC plate. Rotate the pickup plate to align your 30 degree mark with the crankcase index arrow when at high RPM (full advance). Secure the plate with the two socket head screws, and recheck your work.

You have now accurately timed your ignition at total advance, a much more important parameter than static timing. At idle RPM, the edge of the TDC "notch" will be close to the crankcase index arrow (about 4-6 degrees initial advance). Blip the throttle, and your timing should smoothly advance from near the "notch" to your 30 degree mark. See my attached sketch for clarification.



TDC Plate
(Not Drawn To Scale)

With my total advance set at 33 degrees, I experienced slight detonation under load when at the bottom of Death Valley in February. Performance is markedly improved with advanced timing.

So, K-bike ignition timing is not a mystery, but quite easily accomplished by those so inclined and able. Try it!

A note from Don Eilenberger <deilenberger@monmouth.com>: It's not necessary to do the math described above if you don't want to. Simply get or make a degree wheel (the protractor your kid has is a good starting point) and scribe in a line at the 30 degree mark!

Tech Tips - BMW Owners News [Sometime in 1989 or 90]

By: David Parker 3552 E. Marcus St., Saginaw, MI 48603

Last August we discussed timing your K-series motorcycle. Since the K75's use three coils, and the K1OO's use only two (dual) coils, timing is different for the two models. **Steve Burford** of Indianapolis went to a lot of trouble timing and adjusting his K100, and wrote us about it.

I followed the instructions in the August, 1989 issue on timing K bikes, with my trusty Haynes manual alongside. Disassembly proved somewhat difficult, due to a slight corrosion build up. Be real careful taking the ignition rotor off (that's the pot shaped item under the backplate). If you bend it, the rotor will then contact the pick-up coils and generally make a mess of your ignition trigger assembly.

I finally got the timing plate off (the flat plate with the 'V' notch), again due to corrosion. The trick in this case was to insert two very small allen wrenches on opposite sides of the plate and gently rock it back and forth until it came off.

The plate from my machine measured 2.051 inches in diameter, and had a 'U' shaped notch in it counter-clockwise from the 'V' notch, or 0.420 inches from the notch (24 degrees). That represents the spec for advance range, according to my Haynes manual. In fact, all the parts referred to in the August article are identified on page 157, Sections 4.4, 4.5, 4.6. I ran a check after reassembly and found my bike was timed to the 'U' notch (24 degrees).

When reassembly is started, make sure the timing plate is put on the correct way. In my case this meant with the 'U' notch counter-clockwise from the 'V' notch.

The K75's have three coils, and the K100's have only two (dual) coils. I timed the engine of my K100 from the front coil, which connects to cylinders 1 and 4.

The engine must be warmed to normal operating temperature prior to setting timing. The computer apparently controls timing in relation to the temperature, so the advance will be wrong if set on a cold engine. I'm running with 33 degrees total advance measured at 6,000 rpm. Using high test gasoline, I get slight knocking under load at 3500 rpm.

Thanks to Rob's article, I can now monitor an adjust my timing according to a timing light, not by guess or dial indicator. Please note: There is no one rpm where advance stops until you reach red line. If you check it at 1600 and then again at 2500, it will be different. The steadiest advance seems to be between 5,000 and 6,000 rpm.

Steve also played around with the balance on his fuel injection system. Both the factory and the BMW dealers use mercury vacuum gauges to set the fuel/air mixture, but apparently both use wider leeway than most owners would use. I found mine needed adjustment, as did Steve. Using 4-tube Carb Stix connected to the throttle bodies (there are connections there) as described on pgs.146 and 147 of the Haynes manual lets you really lock them just right. Steve is now reporting 42 mpg on his K100, while I usually average around 47 on my K75S.

K-Bike Ignition Timing

By Greg Amy
January 2000

I have an alternate method to timing K100s, alternate to the known methods posted on the IBMWR site:

http://skylands.ibmwr.org/tom/tech/k75_timing.html
http://skylands.ibmwr.org/tom/tech/k100_timing.html

I've never worked on a K-bike before, but I'm pretty handy with tools (work on cars a lot). I studied these methods and deduced that it could be a pretty easy job. I pulled mine apart and looked it over, and saw how it was done (and I also considered Don's edition of using a protractor instead of linear measurements - that way seems easier.)

However, I learned a few things from Don in private email: first, the center of the V-notch represent TDC; second, that there is an additional notch on the K100 bikes, that being a round-cornered notch at 24 BTDC. From Don's pages on the dyno testing of 30 BTDC I deduced that timing the K-bike via the convoluted factory method of measuring valve lift and rotating the Hall Effect sensor results in a timing of 24 BTDC. Based on that, I assumed (hopefully correctly) that I can use my Sears timing light to check and see if that were correct. It were. I used all four of my hands to hold a mirror and the timing light and to rev the engine (you shoulda seen it) and I verified that on my K100, at least, the timing is dynamically set to that round notch (why doesn't the factory do it that way...?)

Not wanting to rest on my laurels (and wanting 30 BTDC) I thought back to the listed procedure. Sure seems like a lot of work to mark a timing mark. Then I looked over at my nifty-difty Sears timing light and remembered I bought an adjustable timing light. With that device I can dial in any advance into the gun and it will automatically move the TDC mark for me. Example: I can dial in 24 BTDC into the gun, and when I rev the engine it will show the TDC mark lined up.

So, I took my nifty light and checked the idle timing. I found that the static timing at idle is 9 degrees BTDC.

Finally, the 30 BTDC. This was the easy part. 30 (desired) - 24 (factory) = 6 more advance desired. 9 BTDC at idle + 6 = 15 BTDC idle setting by the light.

So, in a very roundabout way, I'm saying that if you don't want to do the rotor marking, and you have an adjustable timing light, then if you set you ignition timing at idle to 15 degrees, this should translate to 30 BTDC total advance. Alternatively, if you're into the measuring and marking, then mark your rotor at 15 BTDC and use that as your setting at idle, instead of bothering the neighbors with zipping the bike to 6K.

I'd really like it if someone that has already marked their rotor, and has access to an adjustable timing light, could verify this.

I've been riding the bike for a week, and I don't detect any detonation and the bike seems to run fine!

By Rob Lentini <roblentini@cox.net>
'87 K75S
Tucson, AZ
K Whiner MC#11

Here's a manual method of setting L-Jetronic K bike fuel injection CO (carbon monoxide) mixture without the need for an exhuast gas analyzer:

1. Thoroughly warm the engine.
2. Remove the rubber plug from the top right corner of the air box, above the engine. Using a 5mm allen, adjust the air flow meter idle air bypass screw under the plug for highest attainable idle speed. This should be about 1-2 turns out from the fully-seated position CW.
3. Using a Carb Stix mercury manometer or vacuum gages, reset the butterfly bypass screws to resynchronize and establish an idle of 1050 rpm, or about one tach needle width above 1000 rpm.
4. Now turn the idle air bypass screw CCW (from the top) until rpm is lowered by 50 rpm to 1000, about 4-5 total turns out. *(This is called the lean drop method of setting CO, if you don't have an exhaust analyzer.)*

If you live above 4000 ft elevation, be sure to install the high altitude compensating plug into the harness. There's a receptacle taped to the frame on the left under the side panel.

As a final check, you know you have done it all correctly when:

1. You press the starter button with the engine running and the rpm stays the same or slightly increases (enriching signal to the computer).

2. You pull out the high altitude plug and the rpm also increases (again, enrichening signal to the computer, but less so than the starter. You've set it lean, so enrichening will increase rpm).

Don't forget to reinstall the rubber plug. I've also assumed you've got a 2 valve K with L-Jetronic injection. Motronic works differently. Have fun!

Throttle Position Switch Problem Solving

By Mogens Petersen
November 2001

I have inspired one problem with my '83 K100 with an EML GT200 sidecar.

On a journey the engine was suddenly cutting in and out periodically like dirt in the fuel.

After trying changing the spark plugs and the HT leads without any result, I tried to remove the plug to the butterfly switch----and suddenly all problems where gone!!!

When I got home I carefully broke the switch a part and it showed out that it was full of water.

After drying out the house and cleaning the switch contacts (in fact the butterfly switch consist of only one microswitch for indication of closed throttle and one larger switch for full throttle) I rebuild the butterfly switch and sealed it with silicone glue, put on the plug again and it has been OK ever since.

The problem seems to have been that the water had made a shortcut so the computer was thinking that I have closed the throttle ore was driving with more than full throttle and it therefore made a cut-off to avoid over driving the engine.

But the strange thing is that the bike is running perfectly well without the butterfly switch connected?

Thank you for a very good "page"

best regards

Mogens Fleron Petersen
Denmark

Final Drive Ratios

Date: Wed, 29 Nov 95 10:37:12 MST
From: Rob Lentini <roblentini@cox.net>
Subject: BMW: K final drives

Lon asked: How do I change final drive rations on a K?

All rear disk brake non-paralever final drives are interchangeable. Ratios commonly go from 3.2 on a K75 to 3.09, 3.00, 2.91 on a K100RT, to 2.81 on a K100RS. Used units can frequently be had for $300-400. New ring and pinion sets are a lot more, like $700, and labor to install is extra, of course. Note: Early K100s have a different final drive spline design, so a new/used driveshaft may also be required.

The only K75 final drive that WILL required a ring and pinion set to change ratios is the early K75C drum brake unit. These only came in a 3.2 ratio.

Newer paralever K final drives are equally interchangeable, I believe.

Rob Lentini
'87 K75S
Tucson, AZ
K Whiner MC#11

My pages have been moved to a new location at www.largiader.com.

This specific page is probably at http://www.largiader.com/removal/removal.html

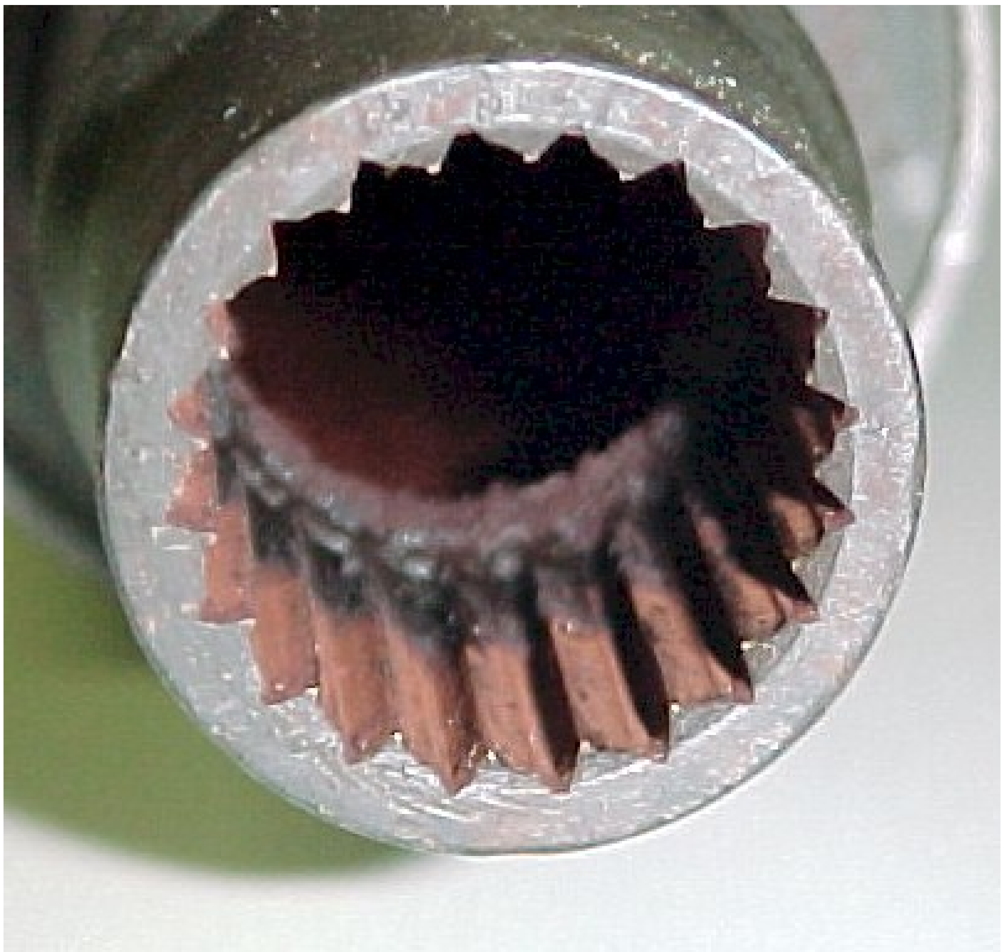
Please change any bookmarks to reflect the new website. This AOL website will be closed by early 2003.

- Anton

The Value of Driveshaft Spline Maintenance on BMW Monolever K-Bikes

When I bought my '88 BMW K75S in August of 1997, I studied the maintenance schedule in the manual that came with it. It recommended an interval for clutch hub/transmission input spline lubrication, but it said nothing about lubing the driveshaft/final drive splines. The bike had 35,713 miles on it and the service records indicated a "spline lube" had been performed at 24,130 miles, so I didn't worry about it.

Then I discovered the Internet BMW Riders web site, the K-Tech section, the Rear Spline Lube article, and eventually the email list, where there was some discussion of driveshaft spline failure. I tried to ignore it. Two years later, at 61,063 miles, I decided to check my driveshaft splines using Anton Largiader's Monolever K rear drive removal technique. The driveshaft splines looked like this:



"[This photo] shows a driveshaft I wouldn't leave the garage with. It's toast.

"The wear is very evident, but I have seen wear this bad that was lubed and returned to customers by wrenches who didn't bother to really LOOK at the splines."

-Don Eilenberger, Guru of BMW Motorcycle Maintenance and Repair

Although worse cases have been reported, including a driveshaft on which the points had started to roll, several people who saw these photos advised me not to ride the bike before at least replacing the driveshaft. Many recommended replacing the rear drive too, which looked like this:

It's a little harder to see the wear here, but according to Don:

"The sawtooth look for the splines is a huge clue that they are badly worn. Putting a new driveshaft on without replacing or rebuilding these splines is going to quickly ruin the new driveshaft."

So I priced new parts and found that they were in the neighborhood of $1000. I was able to buy the driveshaft and rear drive from a wrecked K75RT for $400. Although these parts had been in service for 84,854 miles, they had been lubed with Honda Moly60 at roughly 10,000-mile intervals and they looked great.

Fast forward: On November 8, 2001, these parts had been in service for a total of 132,526 miles. I disassembled them for a lube and took this photo of the rear splines on the driveshaft:

The wear can be seen in the step in the side of each spline. There would be no step in unworn splines.

Update: February 14, 2003: 20,000 miles later, the splines show very little additional wear. This driveshaft/final drive combination has been in service for a total of 152,188 miles.

There is some matching wear in this photo of the rear drive splines.

The wear can be seen as the shiny part on the left side of the valley on the top splines.

Final drive pictures

By REDLOH
April 2000

I am wondering if there is some way these picturesÝcan be posted, just as a reminder to check and change final drive oil.

Picture #1

Picture #2

Final Drive Ring Gear Oil Seal Replacement

By John McClellan
July 2001

Disclaimer: I am not a professional mechanic. I do, from time to time, attempt procedures and activities which I probably shouldn't, but where's the fun in that? My comfort level in smacking around my bike may be greater than yours - if so, seek professional help. Nuff said.

The final drive case (two pieces) houses a ring and pinion gear set. Both the ring gear and the pinion gear have an associated oil seal to keep the precious fluids from leaking out. My ring gear oil seal forsook its duties, so I read the procedure in the Clymer three times, and dove in. The Clymer describes a jig used to hold the FD unit during repairs, which although handy I'm sure, you can prolly do without (I did....).

Read through this completely before tearing things apart. Be sure it makes sense to you! Also, this is a great time to lube the rear splines!

Tools:

- The Usual Stuff (sockets, torque wrench, wrenches, drivers);
- Hammer and assorted pieces of wood (drifts);
- Half-expended roll of duct tape (diameter= 4-1/2 inches +/-);
- Nice clean work area/bench with good lighting;
- Cleaning compounds and cleanliness preservation items (plastic bags);
- 3-4 favorite CDs.

1. Remove the FD unit as described by others (see K-tech articles!).
2. Remove brake disc from FD unit (two hex (allen) bolts).
3. Mark the FD case halves across the seam, so that when you re-assemble, you can align the case halves properly. Remove FD case bolts (eight, wheel-side).
4. Separate FD case halves (ring gear is fit to wheel-side final drive case) using a plastic hammer to loosen; bag the part you will not be working on (outer FD case and pinion gear) for cleanliness.
5. Use heat gun (as recommended) to heat FD case for about five minutes (don't heat the ring gear assembly, just the case/cover), then tap out ring gear (bearing will go with it); the oil seal will be left behind in FD case.
6. This is a fine time to examine the teeth on the ring and pinion gears.
7. Take the ring gear/bearing assembly and bag it, then chill it in the freezer - it needs to shrink a little so that it will fit back in the FD case half during re-assembly.
8. !Keep track of the shim that goes between the ring gear and the FD case half!
9. Tap out old oil seal from the FD case half with a hammer and a drift - get a good idea how it sets in the FD case BEFORE you knock it out.
10. Clean FD case thoroughly.
11. Put a little oil around the edge of the new oil seal where it fits in the drive case. Tap in new oil seal (lovingly, it's spendy) with a hammer and a drift. You can get the BMW special drift tool, or use what I did - a roll of half used duct tape! It's kinda soft (to prevent damage to the seal), and about the right size. You may have to adjust your roll to get the correct diameter - it will be pretty obvious when things are apart. Basically, you will want the drift to be able to seat the new oil seal from the inside of the case.
12. When the seal is seated, get the ring gear from the freezer. Place the ring gear assembly, gear-down, on a pair of 2x4s on-edge, to hold the bearing off of any surface, and then placed the FD

case over that.

13. Tap the FD cover (with the new oil seal installed) onto the ring gear assembly (with a drift!) - if it wiggles, check the 2x4 supports - nail 'em down if need be. !Make sure you have the shim in place between the ring gear and the case!
14. Put on a new FD cover gasket (it's a lot cheaper than the oil seal).
15. Tap the two FD covers together (using a drift), taking care as always to make sure that the case is well-supported in several places, and won't wiggle when you apply the drift. Make sure the FD case halves are aligned properly.
16. Put on the brake disc, put the FD unit back on the bike, put in fresh oil, and if there are no leaks, pat yourself on the back.
17. Ride test.....

Muffler Vibration Fixes

By Peter Cooke
August 2001

My K1100LT (60,000 km) has a vibration at ~3000 rpm. Initially I retorqued the engine mounts to spec (~40 N-m) as directed by the Clymer manual. The 2 front rubber mounted ones were in fact quite loose, the rear 3 were tight. The vibration was a little bit reduced.

My bike shop found that the faring support bracket was sheared at the lower end and needed welding (probably caused by dirt road riding). A lot of the vibration stopped (but not all).

Another local BMW shop said that the main source of vibration in K1100's is a cracked header pipe where it joins to the muffler. Sure enough there is a crack in the header (I haven't fixed this yet - next week).

However I replaced the rubber mount between the muffler and the bracket attached to the centre stand mount (the original was actually bent). The vibes at ~3000 rpm immediately vanished.

I am hoping that the remaining lower level vibration will disappear after the header has been welded. I thought that this might be useful info on your web page since it is not that obvious to check the exhaust system as a source of vibration (not to me anyway).

Curing Early K100 Vibration Problems

By: Don Eilenberger

As a new owner of an 85 K100RS, what did you do to cure the vibes?

Lots - I'll list them more or less in descending order of effectiveness:

1. Bashed heat shield on muffler so it doesn't pinch between exhaust and left foot peg mount. Result - no (NO!) vibrations noticeable in left foot peg.
2. Refitted right side crash bar so it doesn't rub against the fairing ... a few washers under one of the mounts did it. MAJOR reduction in fairing noise and vibration. This one I blame on the dealer since they installed the bars.
3. Retimed bike to 30 degrees full advance (had been set at 24) ... major reduction overall in vibration. See IBMWR tech pages for how-to-do (Lentini method - which I slightly modified - measure ANGLE instead of circumference ... you'll understand when you read it).
4. Use premium gas - some better than others - generally best on Sunoco Ultra, OK on Mobil premium ... this can be noticed right away. Later models may be able to use regular gas - the '85 cannot and stay happy. I can frequently feel an immediate difference when changing brands of Premium gasoline. Experiment and find which one your K likes.
5. Went through RT fairing adding rubber wherever I saw rubbing occurring ... it's pretty obvious where it occurs 'cause the paint between parts is worn, or you'll see shiny spots. Requires disassembly, but basically easy to do.
6. Replaced the O rings on the bar-end weights - these wear out and dry up. Install the weights so the ends don't quite touch the end of the bars (they have to be free to vibrate - which absorbs bar vibes ...) Helped a bit - not a major factor.
7. Retorqued all engine mounts - had been done by a butcher (air-wrench prolly) - to specs shown in book for 1985 - which are done in a diff sequence than later models. We're starting to get to where things are subtle - but still noticeable. Also - check to see if any shims are missing - loosen one mount at a time - if the frame moves away from the engine - you need a shim there. I made several from some thin flat stock. Made some difference at some peak vibration periods - but again, not a MAJOR difference (we are working our way in descending order of effectiveness).
8. Replaced rubber mounts for handlebars - minor effect.
9. Foam grips (not so good if you have heated grips) ... minor improvement, if any, but I like the larger grip.
10. Get ridda the stock seat. Like sitting on a cinderblock. Get a Russell made. If you need a seat to borrow while Russell makes your seat - lemme know. I have a loaner (and 1985 is different than other years).
11. Played around with some rubber under the tank ... was able to reduce vibration in the tank where my knees touched it - also added the rubber pads to the sides of the tank - good for vibes plus insulates your knees from the heat from the tank (and it DO get hot in the summer).

And lots of little things ... chase any source of vibration - like anything that CAN vibrate and damp it (I have self-adhesive thin rubber foam tape - about 2" wide - works great for this)..

Make certain the BMW upgrades were performed on your bike. At Fontana, I actually saw an '85 K100 which still had the original footpeg mounts.

Plus it prolly helped when I:

1. Rebuilt the intake - replaced all the rubber - (throttles to air-box, throttles to head) - had leaks -

causes rough running - causes vibrations.

2. Replaced the rear-main seal, which didn't really NEED it, but the O-ring in front of it did - on retorquing the nut on the clutch basket (you first tighten it to XXX FT/LBS, loosen it, then retighten to somewhat less FT/LBS) much of the engine rattle on de-cel (common on K's) went away ... suspect it took up some play in the secondary shaft that had developed from wear.

The two above - you can PLAN to do ... your bike is old enough, and both are caused by the aging and drying up of rubber parts..

The results of all this are - it has less vibration in it than later models of the K100 that I've ridden - and about the same or less than the K11 ... also - if you still have a remnant of vibes in the bars ... some people have suggested putting lead shot into them - I bought gel palmed gloves (Olympia Model 400) - with these on - there is NO vibration reaching my hands AT ALL ... they work great.

Also - a FWIW. I added a throttle-lock-screw (standard BMW issue). Before installing the screw I found I got real pain in my right hand and wrist. I suspect the pain was caused by gripping the throttle grip tightly enough to keep it open all the time. Adding the screw, and adjusting it to a neutral adjustment (throttle stays where it is set, but is easily returnable to closed) cured this pain instantly. Have not had any wrist pain or numbness - even after 12 hours of riding.

I also like the throttle lock because it helps me ride the bike smoothly. The throttle on a K is very sensitive to on/off transitions. Loaned one to a fellow club member who has a K100RS - haven't been able to get it back yet!

BMW: Moly Spline Data & Tip

By: Frank Glamser
August 1999

Because I was getting a new tire and plan a very long trip this summer, I decided to lube my driveshaft splines way ahead of schedule. My K75RT has 76,000 miles on it and has had Honda Moly 60 paste on all splines for 25,000 miles. The driveshaft was last lubed 5,000 miles ago and 11,000 miles before that. Upon inspection the rear shaft spline (female) and rear drive spline (male) still had lube on all surfaces, and there was no evidence of dryness. Much of the remaining lube was still greyish in color. When I checked it the last time (11,000 miles) the color was more blackish and there was less lube on the splines. The rear drive splines look as good as new. The rear spline of the shaft looked very good with no clear evidence of wear. Because of its darker color and female design it is harder to judge. The back splines were so well lubed I didn't bother with the front ones. Based on what I've seen, 10,000 miles would be a good interval for lubing all the driveshaft splines.

In addition to using a different lube than that recommended in the FAQ instructions by John Diaz et al, I used a slightly different procedure to get to the splines. Brian Curry shared it with me at Daytona, and he got it from Anton Largiarder. This method is much easier than the standard way and should be included in the FAQ writeup IMO. I'd also suggest that BMW #10 may not be the way to go on older, out of warranty bikes. Many prezzes use a moly fortified lube.

Lubricating the Rear Splines on a BMW K75 Motorcycle

- Jon Diaz
- Tony Thomas
- Ben Zaborowsky

Put the bike on the centerstand and remove hardbags (if any).

If the muffler is still hot, let it cool or cover it with something to protect your hands. The first thing is to loosen the two nuts that hold the fender on. These nuts are inside the rear tail section. You access them by lifting the seat and removing the rear compartment cover. Two plastic caps cover the nuts. Pry off these caps and then loosen the nuts with a 10 mm wrench or small socket wrench and 10 mm socket. Note that you only have to loosen these nuts. You do not have to take them all the way off. There are also two screws above the license plate that must be removed before the fender can slid rearward and off. The license plate will most likely have to be removed to get to these screws. After the screws are removed, slide the fender rearward and off. (The fender is the black plastic piece that the license plate fastens to.)

Next, remove the hubcap (if you have one) on the left side of the wheel by prying it off. This exposes the lug bolts. Remove the four lug bolts and slide the wheel out. Notice that there is a thin spacer between the rear wheel and the final drive unit. Be careful to note the location so this spacer making sure that it does not fall off the wheel.

Remove the bolts holding the brake caliper and then loosen it from the disk. Notice that the front caliper bolt holds a clip which retains the speedometer drive cable. Normally you can remove the saddlebag mount, but in this case we had to remove the right foot peg mount and saddle bag mount as one unit because we could not get the saddlebag mount loose from the foot peg mount. The saddlebag mount is attached to the rear subframe of the bike by two bolts and the foot peg mount is attached to the transmission by three allen head bolts. Be careful to notice the location of the brake pedal return spring before removing the foot peg mount. You can tie this combination of saddlebag mount and foot peg mount up out of the way or leave it dangling if it is not in the way.

Next remove the lower shock absorber nut. Put something under the swingarm to hold it up when the shock is removed. It is important to support the swingarm because otherwise the rubber boot between the swingarm and the transmission may be cut by the sharp machined edge of the swingarm if the swingarm is allowed to fall. If the boot is cut, moisture may enter the spline areas. This is bad. Pull the shock loose from the bottom mount, sliding out towards you. Pull the shock absorber up and out of the way as far as possible and secure it with a bungie cord stretched across the seat.

Remove the screw holding the speedometer drive cable on the final drive and pry it up and away. Move the speedometer cable off to the side, out of the way. Put a piece of masking tape over the speedometer drive hole in the final drive so nothing will fall in during the next steps. Now that the shock absorber is out of the way, pull the caliper off to the right side of the bike and bungie it out of the way. There should be nothing attached to the final drive at this point.

Loosen the four bolts that hold the final drive to the swingarm. Pull those bolts out and slide the final drive out to the back of the bike. Be careful not to drop the final drive. Sit on the floor with your legs under the final drive when you pull it. After you pull the final drive off, carefully set it aside, making sure that the speedometer drive hole is up, so the gear lube doesn't run out.

The exposed drive shaft extends out of the swingarm a little bit. Place a piece of wood against the drive shaft and give the wood a gentle tap with a mallet. This breaks it loose from the front spline in case it was stuck. In order to remove the drive shaft, first make sure the swingarm is parallel to the ground. Next, put a rag around the exposed rear end of the drive shaft and using a pair of Channel Locks over the rag, clamp down and pull the drive shaft rearward until it comes loose. It should take a healthy tug to get it loose. Remove the drive shaft from the swingarm.

Clean off the old grease from the splines on both ends of the drive shaft with mineral spirits, gasoline, or contact cleaner (disclaimer: this stuff is flammable, so use it outside and act accordingly) and an old toothbrush. Make sure you get all the junk out of the valleys of the splines. Wipe them dry with a clean cloth. Similarly clean the spline of the final drive, being carefully to keep the speedometer hole up at all times. The easiest way to do this is to have someone hold the final drive unit and slowly turn the brake rotor while you clean the splines.

Now, inspect the fit by mating the drive shaft spline to the rear drive unit. The fit should be tight, but loose enough to get the splines together and apart without being sloppily loose.

While you have the rear drive unit off check the swingarm for any looseness in the swingarm bearings by grabbing the swingarm and wriggling it side to side. It should feel tight and not loose in a side to side movement. Also move the swingarm up and down to make sure it moves freely, is not binding, and nothing is restricting the swingarm in its normal arc of travel. You should be careful only to move the swingarm within its normal arc of travel so as to not damage the boot.

Now you are ready to grease the splines and start the reassembly process. The red BMW spooge that comes in the cylindrical tube is good. Costs $7-10 and gives you enough for hundreds of lubes. Ask for BMW Lubricant #10 Part Number 95 00 9 000 190.

Put a little grease on your finger and apply it to the splines on the U-joint. Make sure you fill in the valleys of the spline. A large amount is not required since it is forced off when you push the drive shaft back on the the rear of the transmission. Don't put any grease on the final drive end of the drive shaft just yet or you will get it all over everything.

Making sure that the swingarm is parallel to the ground, insert the drive shaft into the swingarm until it contacts the back of the transmission. Jockey it around until the drive shaft is engaged into the transmission splines. Once the teeth are engaged, push it until you feel the resistance against the circlip. Now push the drive shaft hard with the heal of your hand to engage it. You should feel it engage and it will not pull back out with normal hand and finger tugs. Now load up the rear drive shaft spline with grease, liberally coating it and making sure that you fill in the valleys of the spline. Likewise grease the splines of the rear drive. As before this is easier if someone holds the rear drive with the speedometer cable opening up and slowly turns the disk rotor while you grease the splines.

Push the rear drive into the drive shaft until it mates with the swingarm. Align the bolt holes, insert the four bolts, and tighten them finger tight. With your handy-dandy torque wrench tighten the bolts to spec. (We didn't have a torque wrench or the specs, so we tightened them "real tight" and Tony torqued them later.)

Un-bungie the brake caliper and place the caliper over the brake disk (rotor). Before you tighten down the caliper, make sure that the clip for the final drive speedometer cable is on the front caliper bolt, and stick the shim for the ABS sensor between the sensor and the toothed ABS gear/rotor on the final drive. Tighten down the caliper, making sure the proper clearance is maintained.

Put the wires back in the holders on the swingarm and caliper. Put a small amount of grease on the O-ring for the speedometer sensor to help slide it into place. Push the speedometer sensor back into the hole in the final drive and fasten it with the allen bolt removed previously. Wipe the brake rotor with a mineral spirits or brake cleaner and clean cloth to remove any grease or junk that may have accumulated on them. Install the foot peg mount and bag mount, making sure that the ground wire for the right ABS modulator is in place before the foot peg bracket is put back on. Also make sure that the little spring for the foot brake lever has not been lost and is in its proper place. Tighten everything down.

Put the wheel back on, making sure the spacer is still attached, put the lug bolts back in, and tighten them down to 77 foot pounds. Put the hub cap (if you have one) back on. Note that the hubcap has a detent that orients it to fit on only one way. Re-install the rear fender and attach the license plate.

You have just finished your first rear spline lube. Congratulations.

Time approximately an hour and a half.

Notes from a spline lube of Tony's '92 K75S on 4-3-94

Standard disclaimer applies.

Ben Zaborowsky
benz@lilly.com or benz@ncsa.uiuc.edu

Driveshaft Spline Repair

By Bertrand Vogel
June 2001

I found a company in England who repairs the splines on the K-bike drive shaft. They will cut your spline and weld a new one. You have to send them your old shaft, and they will send you a rebuilt. Carriage to the USA/Canada by insured air mail 22.50GBP. The repair is 60.00GBP so the total would be 82.50GBP.

If you prefer to repair the shaft on your own, they will supply the spline but you would have to agree to relinquish any claim against them if the shaft is not serviceable after you have fitted it.

You must NOT machine the drive shaft to make the insert a good fit, you must machine the insert to make the fit. The part no is #55552 @ 38.50GBP 3.50GBP postage = 42.00GBP total. The insert is welded into final position and can only be used on 1986 on 20 tooth splines.

For more information, contact:
Moto-Bins online sales BMW M/Cycle Spares
Peter@motobins.co.uk

Spline Lube Checklist

By Deryle Mehrten
July 2000

TASK	SUBTASK	Completed
Remove Body Parts		
	Take off Tank Bag	
	Take off Rear Trunk	
	Remove Side Covers	
	Take off Taillight Fender	
	Remove Rear Fender	
	Remove Belly Pan	
	Remove Hard Bag Mounts Left Side Holds Muffler	
	Remove Coil Cover Disconnect Accessory Plug(s)	
	Remove Alternator Cover (Right side)	
	Take off Left Lower Fairing Panel	
Take Seat Off		
	Remove Seat Stay Arm Clip	
	Remove Rear and Side Stay Clips	
Remove Under-seat Tray		
	Remove Brain	
	Remove Brain Box Left Side Cover	
	Remove Retaining Pin on Right Side	
	Slide Brain Out	
	Disconnect Brain Master Socket	
	Put Brain in Safe Place	
	Disconnect Any Accessories	
	Remove Tray (Check for Rubber Mounts)	
Remove Battery		
	Unbolt Battery Clamp	
	Disconnect Battery	
	Negative Terminal From Engine Case	
	Positive Connections at Battery	
	Pull Over Flow Tube From Transmission	

	Remove Battery	
	Unbolt and Remove Battery Plate	
Remove Gas Tank		
	Pull Tank Clips	
	Disconnect Fuel Line/Fuel Return Line	
	Disconnect Fuel Pump/Gas Gauge Electric Lines	
	Lift up Rear of Tank, Pull Back and Lift Tank off Bike	
Remove Radiator Over Flow Tank		
	Disconnect Radiator Tank Over Flow Hose at Radiator Cap	
	Pull Radiator Over Flow Tank From Frame	
Remove Rear Wheel		
Disconnect Electrical Lines		
	Unplug Rear Brake Switch Line	
	Unplug Speedometer Drive Line	
	Unplug Gear Indicator Switch Line	
	Unplug ABS Sensor Line	
	Unplug Right ABS Unit Line	
	Left ABS Unit Does Not Need to be Disconnected	
Take off Footpeg Mounts And Rear Brake Caliper		
	Remove Left Mount:	
	Unbolt Left ABS Unit From ABS Bracket	
	Unbolt ABS Unit From Engine	
	Suspend Left ABS Unit From Frame	
	Unbolt Footpeg Mount and Remove	
	Remove Right Mount:	
	Unbolt Rear Brake Caliper	
	Unbolt ABS Unit from Engine	
	Unbolt Footpeg Mount	
	Take Off as a Complete Unit:	

	ABS Unit, ABS Bracket, Rear Caliper, Master Cylinder, Reservoir and Footpeg Mount	
	Be sure to Locate and Remove Brake Arm	
	Retaining Spring	
Remove Muffler		
	Take Off Muffler Cover	
	Loosen Headpipe Clamps	
	Remove Muffler by Vigorous Shaking While Pulling Back (Note Which Clamp Came off Which Pipe)	
Remove Clutch Arm		
	Disconnect Clutch Cable	
	Disconnect Side Stand Retractor Arm	
	Loosen Rubber Boot Clamp	
	Drive out Clutch Arm Pin	
	Drive First From Left Side - Far Enough to Remove Side Stand Arm and Spring	
	Drive Out Pin From Right Side all the Way	
	Remove Boot From Trans & Arm	
	Examine Boot for Any Rips or Tears	
	Replace if Any Rips or Tears	
	Clean and Grease Both Arms	
Remove Rear Drive		
	Block Up Swing Arm or Suspend From Frame	
	Unbolt Shock Absorber	
	Unbolt Rear Drive and Remove	
	Lube Rear Drive Splines	
Remove Swing Arm		
	Remove Retaining Screws on Right Side	
	Pull Right Side Plug	
	Loosen Left Side Lock Nut	
	Unscrew Left Side Plug	
	Pull Back on Swing Arm (Rubber Boot Should Come Off Transmission)	

	Drive Shaft Should Remain Connected to the Transmission Out Put Shaft	
	Examine Boot for any Rips or Tears	
	Replace if any Rips or Tears	
	Remove Drive Shaft	
	Pull Back Vigorously to Disconnect the Snap Ring Holding Swing Arm to Transmission Output Shaft	
	Lube Drive Shaft Splines - Both Ends	
Remove Electric Starter		
	Remove the Two Retaining Bolts	
	Pull Back to Remove	
	Examine Rubber O-ring for Damage	
	Replace O-ring if Worn	
Block and Brace Bike		
	Rope From Ceiling or Use Saw Horses	
	Place Blocks Under Motor	
	Block Front Tire to Prevent Rolling Forward	
Remove Side and Center Stand Mount		
	Remove Four Stand Mount Bolts (Bolts May Require Replacing)	
	Side Stand and Center Stand Will Come Off With the Mount	
Remove Transmission		
	Place Blocks or Rolling Jack Under Trans	
	Remove Transmission Bolts	
	Slide Transmission Back	
	Lube Clutch Spline	
	Lube Transmission In-put and Out-put Splines	
	Slide Transmission Back into Place	
	To Align Splines Put Transmission into 5th Gear and Turn the Transmission Out-put Spline to Align the Splines	
Reassemble		

	Important to Replace Clutch Arm and Side Stand Arm First. Clearance Problem Otherwise.	
	Be Sure the Rubber Boot on the Clutch Arm is Firmly Mounted and Secured	
	Connect Clutch Cable	
	Bolt on Side Stand and Center Stand Mount	
	The Bike Can be Lowered from the Roof or Taken off the Saw Horses if Desired	
	Connect Side Stand Retractor Arm	
	Connect Drive Shaft to Transmission	
	Besure the Drive Shaft "Snaps" into Place	
	Put on Swing Arm	
	Slide Swing Arm Over Drive Shaft	
	Be Sure the Boot Snaps Over the Transmission Lip	
	Be Sure to Apply Antisieze Paste to the Swing Arm Plugs	
	Insert Right Plug and Bolt into Place	
	Screw in Left Side Plug	
	Torque Left Side Plug to Spec	
	Torque Lock Nut to Spec	
	Put on Rear Drive and Rear Shock	
	Recommend Applying RV Sealant to Rear Drive and Swing Arm Faces	
	Replace Right Foot Peg Mount	
	The ABS Unit, ABS Bracket, Rear Caliper, Master Cylinder, Brake Fluid Reservoir and Footpeg Mount go on as a Unit	
	Connect Brake Arm Retaining Spring	
	Connect Speedometer Sensor, ABS Unit, Rear Brake Switch, ABS Sensor and Gear Indicator Wires	
	The Battery Plate Should be Installed at this Time to Hold the ABS Mount in Place	
	Bolt Right ABS Unit to Engine	
	Push Battery Over Flow Tube Through Trans	
	Replace Left Foot Peg Mount	
	The Muffler Should be Replaced at the Same Time	
	Be Sure to Use the Correct Muffler Clamp on the Correct Header Pipe	
	Install Left Hard Bag Mount to Hold Muffler	

	Bolt Left ABS Unit to ABS Mount and Engine	
	Install Battery	
	Be Sure Ignition and Any Accessories are Off or Disconnected	
	Set the Battery into the Battery Tray	
	Connect Negative Wire(s) to Frame	
	Connect Positive Wire(s) to Battery	
	Connect Battery Over Flow Hose to Battery	
	Replace Radiator Over Flow Tank	
	Connect Rubber Tube to Radiator Cap Mount	
	Slide Radiator Over Flow Tank into Place	
	Install Battery/Over Flow Tank Retaining Plate Mount Under Seat Tray	
	Push Under Seat Tray into Place	
	Insure All Rubber Mounts are in Place	
	Connect Brain to Wiring Harness	
	Slide Brain into Under Seat Tray	
	Push the Retaining Pin In and Push on the Left Cover	
	Connect Any Accessories	
	Replace Gas Tank	
	Lift Tank onto Bike and Push Rear of Tank into Retaining Mounts	
	Put on Tank Retaining Clips	
	Connect Fuel Pump/Fuel Gauge Wire	
	Connect Fuel Line and Fuel Over Flow Line	
	Install Seat	
	Mount Rear Tire	
	Replace All Body Parts	

Heat Shield Rattle

By Tom Coradeschi
July 1994

Brian S. Brumfield wrote;
> 2. The rattle of the exhaust heat shield at 2400 RPMS is driving me
> to drink (not while or around when I ride, of course. :-)). It
> makes an incredible bike sound like a POS... yes, I'm embarrassed
> by it, and I don't consider it "character." :-)

Know it well. Check the welded-on brackets that hold the nuts to the muffler. One of them may well be broken. If that's the case, (and it was on mine) remove the remains of the bracket. That is what the heat shield is rattling against.

K1200LT BMW Autocom hookup - Jim Beard Little Rock - Arkansas

Trunk Removal Page - NEW 10/22/00

CB Antenna mount fabrication page - NEW 10/22/00

Click each Picture for more detail and a description

10/22/2000

Here are 3 of the manual pages reproduced using a scanner and OCR software with the permission of Paul Barrett from Autocom. Right click and save as or just click and load up in MS Word(doc).

Autocom Installation Manual Page 1 - 68k bytes

Autocom Installation Manual Page 2 - 27k bytes

Autocom Installation Manual Page 3 - 26k bytes

1200 LT SML-S-CRA Wiring - thx to Phil Lamb

Autocom Speaker Cutoff 520k bytes

Checking Wheel Alignment

By: Rob Lentini
March 1995

OK, here's how to check wheel alignment on a motorcycle. We're going to measure the lateral alignment of the front to rear tire when both are parallel--going in the same direction.

Place the motorcycle on its centerstand and put the transmission in 1st gear. Tape the center of a 14 ft length of string to the rear tire tread, about 45 degress or so up from the bottom of the tire and to the rear of the motorcycle. Draw each resultant 7 ft section of the string forward to the front tire so that the string is extending to the left and right of the front tire.

Stoop in front of the front tire and, while pulling each string forward to straighten it, adjust the string to where it just contacts the rear tire's shoulder on the forward section of the rear tire. Turn the front tire until its shoulders are parallel with the string you are pulling to either side of it. You now have a plane projected foward to the front tire on both sides allowing you to measure lateral alignment. Any misalignment is simply the dimensional difference from each string to the front tire shoulder. It's very important that your measurement not be influenced by the string touching anything else, such as mufflers, stands, etc.

If the right string is closer to the front wheel than the left, your rear wheel is aligned to the left of the front wheel. This will result in "pulling to the right". Why? Because the center of gravity is moved to the right with rear wheel misalignment to the left. The machine wants to fall to the right, and will have to be corrected with constant left handgrip pressure.

Now then, just because you measure some misalignment doesn't mean there's a problem! Joe Senner has 5mm left misalignment at the rear, and the bike tracks fine until the tires are gone. This is probably more of a function of road crown wear. Conversely, Howard Guenther, even with new tires, has a SERIOUS pull to the right. Something's wrong here, maybe the alignment, maybe not.

As I stated in another post, K-bike alignment may be adjusted by adding/deleting wheel hub shims. On older Rs it can also be done, but I'm not an authority on this. I do know you can fit a slightly larger tire to a /5 and space the hub out for swingarm clearance. Anyone know how to go the other way--move the wheel to the right? Howard may need to know how!

Rob Lentini
'87 K75S
Tucson, AZ

Early K Fork Noise Fix

By: Michael Pabst
August 1999

Here come the parts needed:

31 42 1 452 011	O-ring	4x
232 057	spring	2x
454 620	valve	2x
621	valve body	2x
07 11 9 932 661	shim	1.6mm
706	shim	1.7mm
...	...	...
709	shim	2.0mm
639	shim	0.1mm
695	shim	0.3mm
934 681	C ring	2x

Alternatively, you could get the sport version kit (incl. stiffer springs and stronger dampening): 31 42 9 058 286 but this runs about 200 German marks, i.e. about 200 $ in the US.

For those w/out the BMW repair / parts manuals: The job is fairly simple / straightforward. Only 'special' tool required is a C ring pair of pliers for RR the dampener from the leg.

Installing the above parts requires removing the piston from the dampener rod which requires heating up the piston until the Loctite starts burning. Used a camping cooker - worked fine.

Before removing, mark the piston position to not change the total dampener length. Remove the old valve disc (white plastic) and trash together with the old valve body. Mount 1 of the O-rings onto the new valve, slide it onto the rod with the O-ring downwards, then the small spring (part no ...057), then the 2nd O-ring, then the disk with the many holes, then the 2 inch long spring.

Use Loctite red for securing the piston to the rod. Installing the piston / dampener into the leg requires - acc. to BMW special tool number .... but a piece of thin cardboard works as well to compress the piston ring and get it across the valve body edge in the leg.

Finally, you'll need the right shims - the new valve body is shorter than the 83-85 ones. Use a feeler gauge to determine the shim needed. 1.6 thru 2.0 mm in .1 steps are available. If 2.0 is still too thin, there are .1 and .3 shims available.

Tightening torques (Nm):

- Leg clamp bolt upper: 22+/-2,
- lower: 43+/-3,

- dampener to leg: 20+/-2.

BTW, the late 80s R forks might have the same problem - a friend got that and a similar noise but that's just speculation from my side so far. Have fun / quiet fork / peace of mind.

K100RS Handling Upgrades

By Svein Berlisvei-ber@online.no
September 2000

Thought you might be interested in some changes done to my 1985 K100RS.

I found the handling on twisty road rather below par, and started to look into things. The total package ended up as follows:

Sport forks from a K75S substituted the original "up and down we go" units. This lowered the front a little and gave firmer suspension with better damping and MUCH less dive. BMW 10W oil inside.

The Bilstein at the rear was sent to the permanent archive and a Hagon unit with stepless adjustment on BOTH spring and damping was installed. The spring on the Hagon is stiffer than original and the unit is about 10 mm longer. Super product!!

Pirelli Match MT08 and MT09 went on, with 110/80 up front and 140/80 at the rear.

These changes resulted in a bike which turns better, is more stable in curves, more predictable under braking and with no suspension problems when riding at max load.

PFM cast-iron brake discs and Ferodo pads were installed, giving superior braking.

Also put on a BSM exhaust because it looks nice!!

My K has now done 113,000 miles and still runs beautifully. Superbike!!!

Front End Wobble Diagnosis

By: Don Eilenberger
May 1999

I wonder if any of you have solved my problem before.
My beemer (with an RS fairing) has a tendency to wobble it's front wheel when I loosen my grip on the bars. The problem seems worst between approx 25-35 mph.
It doesn't happen at high speed (thank the lord!)
It also becomes more pronounced when I have a pillion passenger.
Could it be a shock absorber problem?

Dear Stewart, this topic has been covered MANY MANY times on this list - on almost every model of BMW - and certain answers seem to always be presented, so here they are. Not necessarily in order of likelihood to cure the problem:

1. Don't do that. Don't let go of the bars. Hey - it answers the problem!
2. Steering head bearing adjustment - check it or have it checked. Notched or worn bearings can cause this also.
3. Tire - some tires are prone to this behavior - especially as they wear. Have heard of Metzlers doing this.
4. Tire pressure - check it. Make sure it's correct if you have a pillion passenger.
5. Shocks. Can be rear - which effect the front more than you think!
6. Forks. Been serviced lately?

K-Bike Wheel Bearing Replacement

By Jack Gilbert
January 2001

While riding my '85 K100 I'd start to notice a slight droning noise similar to the noise you'd have from aggressive AT tires on a light truck. Since the bike was relatively new to me and I had not logged that many miles, I chose to log the noise in my things to check memory as I got more accustomed to the bike's general characteristics.

After logging a brisk 300 mile run south on Florida's I -95, again the noise started to infiltrate my senses, I started to try a highway diagnosis by shifting my weight right to left and paying strict attention to listen for any audible change. When the lean was hard to the driver's side the roar became more pronounced, which led me to a bearing diagnosis. At 39k showing on the odometer, surely the bearings were due for a replacement. I retired to my "Clymer" manual where I found the recommendation to purchase BMW tool #008 570 "bearing extractor". A quick call to "Bob's BMW," whom I use for all my parts, informed me of a purchase price of approximately $190.00! Time to fall back and punt!

Since I did not believe I'd change enough bearings to ever recover the price of the tool, I would need a reliable alternative method, better call Fred (of CYCLE RECYCLED). A quick comical dissertation on the ridiculous price of tools brought us both to the following method of replacement.

Before you even begin to start have these things ready:

Some sort of 2 x 4 wooden cradle to allow you to work on the wheel while it is laying on its side without putting pressure on the discs. Tire changing levers, rim protectors, tire valve tool, brass or aluminum dowel, two brand new wheel bearings to be placed in your freezer at least 2-3 hours before installation, and a socket in which to drive new bearings in with (should put pressure only on the outer rim while driving them in).

Of course you will also need your usual acumen of tools for the various jobs entwined here.

- Jack and secure bike, allowing enough clearance to remove front wheel.
- Remove one brake caliper, and hang from wire supporting weight do not let hang on brake hose!
- Remove wheel fastening hardware from forks as needed to remove wheel.
- Place wheel on some type of wooden cradle so that it is supported by the outer rim and not lying on the brake discs. I used an old truck pallet with the slats taken out of the middle to let the wheel cradle inside.
- Label both brake discs right & left. I used masking tape and magic marker on discs and wheel and marked valve position & rotation on wheel & tire.
- Remove both discs from wheel by loosening the four allen headed though bolts. Try and note position of heads (which side of wheel) on well run in units, as I believe these parts sort of settle in and may effect general balancing on wheel. Remove discs by gently nudging with mallet and wooden drift from other side - be careful not to drop and damage them when they dislodge suddenly.
- Remove tire from wheel, remove valve stem and any balancing weights.

Now comes the good part! You will need an oven pre-heated to 400 degrees Fahrenheit

- Place wheel in pre-heated oven and carefully time ten minutes. That should be sufficient if your oven is operating within a 25 degree range, which most residential ovens I'm told fall. If hesitant use a separate oven temp gage.

- Remove wheel and gently drop the wheel evenly on wood cradle. That should be enough shock to have the bearing fall out of bottom side. You may turn wheel over and drive the remaining one out with an aluminum drift or brass dowel from the inside careful to notice spacer location and placement when removed.
- Now some accurate haste is needed before wheel cools, or you will have to re-heat to temp. Grab the bearings from your freezer and quickly tap into place using socket, making sure to drive new bearing evenly into recess against the machined shoulder in cast wheel. Flip wheel over and replace spacer as it was, and drive in final bearing! Quickly go to refrigerator and remove your favorite beverage! You deserve it!
- Every thing after this is academic, remember to properly re-torque all fasteners and add loctite wherever it calls for. You've saved $190.00 on the tool and whatever on labor and you've done the job well!

Hope this helps you all out, I depend on you out there for your help too,

God bless you all,
Jack Gilbert
BMWOA#90107

Basic K1200RS Shock Tuning

By James Pellenbarg
November 1998

I am ashamed to admit it, but it was 10 months before I started to fool around with the rear shock absorber settings on my K1200RS. I had not been pleased with the performance of the suspension in that it didn't track small road irregularities well at all. The bike simply didn't want to track in a straight line even on newly paved asphalt. There was a certain drama that occurred while in curves. Suffice it to say I figured it had to be possible to achieve a better balance in the suspenders. By the time I thought about doing something & acting on that impulse, 10 months had gone by.

In short, I set the preload at one inch of static sag (with me sitting on the bike). This turns out to be the second position on the preload ramp as per the book (I weigh 195lbs).

Then came the task of setting the damping. Having been spoiled by an Ohlins on my previous K75S, I anticipated that I needed to add rebound damping to the stock Showa on the K12. As I added damping, I noted while sitting on the bike & bouncing up & down that it behaved as if there was no suspension (didn't move). It would handle large bumps all right but had become very harsh otherwise. I suspected that something was different here, as the damping screw didn't seem to affect med/high speed damping but instead affected the low speed circuit.

During a conversation with a technician at Works Performance, I confirmed that adjusting the Showa did indeed affect the low speed performance of the shock & did "nothing" to the medium & high speed rebound damping. I discovered that at one & one-half turns out from being bottomed in (max hard), that the shock had a 1/16th turn change from compliant to harsh. I finally settled on setting the damping adjustment at 2 & 3/4 turns out from maximum hard (bottom-clockwise) essentially removing any additional damping in the low speed circuit.

The personality of the bike took on a whole different demeanor. It will track straight & true on a smooth asphalt surface now. The uneasy drama during curves has disappeared as well. The bike is capable of swallowing up really bumpy roads with ease & doing so comfortably as well.

If you're not satisfied with the handling on your K12, try adjusting the shock as I did. See if it doesn't make as dramatic a difference on your bike as well. It sure beats the price of aftermarket shocks!

K75 Fork Tuning

By Scott Conary
September 2000

As you all know all too well, I've been tinkering with by bike to solve some handling problems. And mostly playing with the forks.

I had a headshake that was present in straight line riding as well as with the bike leaned over. The bike 'developed' a rhythmic bouncing in the front end at certain speeds. There was also an intermittent knock in the left fork.

What was done: New Steering head bearings, new front tire, rear shock re-build, swing-arm bearings, new fork tubes, new damper piston collars, second new front tire, multiple tear downs of the forks, new rear brake pads and retaining pins, cut down fork preload spacer, and so on. New fork springs in the near future (recommendations?).

What I've learned:

Pay close attention to the order and arrangement of parts! At the bottom of a fork slider is an aluminum spacer. One end is wider. *Put the wide end facing up.* It helps keep the damper assemblies and tubes lined up when the fork is stressed (such as under heavy braking). This in turn might minimize the scraping of the fork springs on the inside of the fork tubes. After I turned mine around to wide side up (I'd originally installed them as I'd found them), the mysterious knocking sound in the front left fork disappeared (it was not related to the valve body shimming). Yes, there is a lot of conjecture in this. But when in doubt, put it together stock.

Do not assume that who ever previously worked on the bike, dealer or not, put it back together correctly. Use the manuals.

When reassembling the forks, play close attention to the alignment of the fork sliders. Misalignment can greatly contribute to stiction. Stiction is a bad thing. With springs removed from tubes:

1. Put the sliders on the tubes, attach to the damper assemblies, but only loosely bolt on the fork brace.
2. Insert the front axle - this is to align the fork tubes.
3. Move the sliders up and down multiple times. If you put some pressure on the sliders from different angles, you will quickly see how misalignment can contribute to stiction.
4. When you've found what slider positioning feels like it produces the least amount of stiction, tighten the bolts securing them to the fork brace.
5. Give them another quick slide to check that all is well.

While you've got the springs out, measure them. Mine have sagged nearly 2 inches. Stock is 395 - 401 mm. Mine are down to a bit under 350 mm. There was also way too much preload for a rider of my size (PO had the dealer install a gigantic spacer). Sag was a bit less than an inch, not the 1 3/4" or so that would be desired. (about 1/3rd total suspension travel)

To measure sag - With bike upright on its tires and unsupported by a stand....

1. Push down on front end, release gently. Measure top of slider to some static point such as lower

triple clamp.
2. Pull up on front end, release gently. Make same measurement.

The difference between those two measurements is fork stiction. Around 1 cm and less is desirable. Take the average of the two, call it measurement 'X' Get on bike. With feet up on pegs (might need helper)....

3. Push down on front end, release. Measure.
4. Pull up, release. Measure.

Again, the difference is a measure of the stiction. Take the average of the two, call it measurement 'Y'

Sag = X minus Y. Sag should be about 1/3rd of total front end travel (total travel was listed in my owner's manual)

If you're alone and without helper, you can use a zip-tie around a fork tube to measure how far the slider moved up the tube (obviously skewed in the push down test). Sag/Preload on an old K can be adjusted by altering the size of the spacer that sits on top of the springs. (hmmm....someone just mentioned that there's an article on this in a recent issue of MCN. Would've helped a few months ago....:))))

I won't buy another Metz 33.

While she does need new springs, she's feeling better than ever. I'm falling in love with her all over again. :) Stable in turns, in a line, and more supple on the bumps. All of the above is gleaned from fellow Prezzes, the archives, and the lessons of too many mistakes.

On the plus side, I can pull the fork springs on my K in under 10 minutes, tops. 8-)

THANK YOU to all who've helped through this saga. I'm sure I've forgotten a few bits. Hope this helps someone.

Scott Conary . 1991 K75s . Reno, Nevada
http://home.reno.rmci.net/fercon
IBMWR Events simian

Fuel+ Installation Notes

By Peter Bansen
April 2001

I recently installed a Fuel Plus on my 1991 K100RS. Manufactured by Electronic Resources in Oklahoma, Fuel Plus is a fuel computer made only for K-bikes. Fuel Plus replaces the factory clock and, using inputs from the speedometer and Motronic fuel injection system, displays a variety of useful information:

- Time of day (24 hour or 12 hour clock)
- Available range on remaining fuel
- Percentage of fuel remaining in tank
- Miles to destination (pre-set distance to destination; display counts down)
- Range tracker - shows the difference between range and destination
- Current fuel economy (in miles per gallon, km/liter, or liters/100km)
- Mark (destination mode set to count up instead of down)
- Resettable odometer
- Daily odometer
- Daily engine run hours

Installing the Fuel Plus requires removing the instrument pod, opening it and replacing the factory clock module with the Fuel Plus unit. You must also make one soldered connection within the instrument pod and another near the Motronic computer under the seat. One wire must be run between the Motronic unit and the instrument pod. Although I had some trepidation about opening the instrument pod and monkeying around inside, I found the instructions to be detailed and explicit. The work inside the instrument pod was actually quite simple.

Removing the instrument pod on the different K models presents different degrees of difficulty. On an RS, the level is probably moderate. The Fuel Plus instructions do a nice job of describing the removal of the electronic windshield on an LT, so owners of the more complex bikes have little to fear.

With the bike on the centerstand, I started by removing both side panels and the clock fuse. I then removed the knee panels that fill the area between the fairing lowers and the tank. I then removed the gauge panels and the trim piece that runs between them. Removing the trim pieces down each side of the windshield allowed me to slip the windshield up and out - I left the little spoiler wing in place at the top.

By turning the bars to one side and then the other, I took the two 10mm nuts and washers out of the instrument pod retainer. I hadn't done this before and wasn't sure how it worked, but I was happy to find that the pod is retained with 'U' shaped clips that fit over two tabs on the bottom. The two threaded portions that secure the clips onto the tab are connected to a flat plate that sits just behind the instrument pod (between the instrument pod and the handlebars). This sounds complicated, but it's far more complex to describe than it is to figure out. It's actually very easy to remove - take off the nuts and washers and slip the flat piece up and out. The instrument pod is now free of the bike, but it won't drop since the clips are still sitting on the tabs thanks to gravity.

You can now grasp the pod and move it free of the tabs, then use a 4mm hex (Allen) wrench to remove the rear connector. As you loosen the rear connector, it gradually pulls free of the pins on the back of the pod.

I took the pod into the house and placed it face down on a towel on the table. Since my wife was out, I used a couple of small glass bowls to hold the hardware as I disassembled the pod. I had never done this before, so I wasn't really sure what I was getting in to. Never fear - the bracket is held to the pod with four socket headed bolts (5mm hex or Allen wrench). Depending on the year, there will be nine or so Phillips head screws that hold the pod shut. Once those are removed, you can gently remove the back of the pod. There is a gasket around the perimeter of the case. Don't worry if you damage the gasket; a new one is supplied with the Fuel Plus.

With the case open, there are six small Phillips screws that secure the instrument package. Remove those and pull the trip odometer reset knob out about 1/4" and you can begin persuading the instrument package to come out. It took a little gentle pulling in a few places, but the unit came out relatively easily. Flipping the instrument package over so that the faces are up, you then use a bent paper clip and some masking tape to temporarily hold the needle on the tach out of your way. You can then remove the clock trim from around the factory clock. This is a little bit of an odd procedure - you need to gently flex the instrument unit towards its back to allow the flanges on the side of the clock trim to clear the instrument faces. Easier to do than it sounds, but a gentle touch is required.

Once the trim has been removed, the clock module can be released - there are four little clips that retain it. The clock comes out, the Fuel Plus unit pops into its place. Make sure that the two pins are properly aligned in the sockets on the Fuel Plus - you can see them from the front when they're properly seated. There's a wire that has to be routed to some pins on the back of the speedometer - make a little hook of the end of the wire around the pin and solder in place. Don't cut the wire, by the way - there's a resistor at the end that is needed.

Drill a 1/16" hole in the back connector close to the brass threaded insert, replace the trim around the Fuel Plus and you're ready to reassemble the pod. Screw the instrument unit back into the case, put on the new gasket, poke the wire through the new hole and put the back cover back on. Make sure you use the correct holes for the instrument retainer screws, by the way. They are adjacent to the case retainer screw holes and it would be easy to make that mistake. Refer to the instructions that showed which screws to remove and you'll be on the right track.

With the instrument pod reassembled, the instructions tell you to place the external wire through one of the square holes on the connector before reattaching the connector to the pod. I found that the external wire was a little on the short side to properly clear the frame when the two sides of the connector were attached. I lengthened the wire coming out of the instrument pod with a short (4") piece of wire soldered on and insulated with a piece of small heat shrinkable tubing, them attached the connector. If I ever need to reopen the instrument pod, I'll need to cut off the connector, but the extension will allow me to do this many times before I need to replace the extension.

The next step is to locate the correct wire in the Motronic harness. You need to unclip the connector from the Motronic, cut the two nylon tie-wraps around the rubber boot and fold it back to see the wires. Mine had another, internal wrapping of some sort of vinyl material that had to be slit a little bit and folded back as well. Be aware that the illustration in the instructions show a connector that looks a lot more like the ABS brain connector than the one for the Motronic on my bike, anyway. The Motronic brain is clearly marked - on a '91 K100RS, it sits flat under the seat on top of the battery. The other computer is vertically mounted between the battery and the front of the rear fender.

The instructions say that the all important wire can be violet/yellow stripe or yellow/gray stripe and that it is a 'larger diameter wire'. I found that mine was of the yellow with gray variety and was buried in the middle of the bundle. You need to access the wire and remove a little bit of the insulation all the way around the wire so you can solder a small wire to it. I made a small hole in the rubber boot, fed the new wire through it, then made the solder connection. I wrapped a tiny piece of electrical tape around the soldered joint, wrapped the whole bundle with more electrical tape to give the new wire some strain relief, then folded the vinyl liner back into place and slid the rubber boot back into position. New tie-wraps on the boot completed the job. I replaced the connector on the Motronic and tie wrapped the new wire to the Motronic harness in a few places.

The new wire needs to run up to the instrument pod, so I included it in some wiring that runs along the frame on the right side of the bike. I didn't remove the tank, but tucked the new wire in next to the rubber air blocks under the tank. The next time the tank is off, I'll tie-wrap the new wire in a few places under the tank. The new wire gets a connector crimped to it, which then plugs into the wire coming out of the instrument pod.

Replace the clock fuse and reinstall the windshield, trim pieces, gauges and knee panels and the job is done. The instructions guide you through some initial settings and you're in business.

A short ride yesterday showed what a valuable tool the Fuel Plus can be. Starting with the default values for a K100, the unit showed a range of about 185 miles as I entered the freeway. As I cruised at about 70, the range gradually increased until it showed something over 200 miles. This resulted from the Fuel Plus learning the actual fuel consumption compared to the distance inputs from the speedometer. As I got off the freeway and started riding some more challenging terrain in a more aggressive manner, the range decreased as my fuel consumption per mile traveled increased.

The Fuel Plus can be custom calibrated to your tank, so adding a larger tank isn't a problem. If you're riding long distances, you can modify your riding style somewhat to decrease fuel consumption (and increase your range) to stretch your riding efficiency and make it to the next source of fuel. This is a remarkable tool for endurance riding and one that gives a BMW K-bike a distinct edge over the other bikes of choice for long distance riders - the Honda ST1100 and Kawasaki Concours. I don't know whether Fuel Plus is available for the K1200RS or the K1200LT, but I don't imagine it will be long before those versions are offered.

BMW Alarm Installation

By William Scott Hiles
February 1996

I just bought a BMW alarm for my K75S from the BMW dealer in Fredericsburg. Being an electrical engineer I figured I could install it myself. As it turns out, the manual for the alarm is incorrect and was dated 1995. I have written up a summary off how the alarm should be installed for the 75S.

Features:

The BMW alarm system is competitively priced to other common motorcycle alarm systems. It consists of two parts that must be purchased: the CPU/sensor unit, and the wiring harness. The alarm for the K series bikes is different from the RS series.

The alarm features:

- Auto rearm after activation
- Remote transmitter
- Two dimensional sensor
- Starter disable
- Immediate trigger when key is in the ON position
- Manual or automatic arm
- Adjustable sensitivity

The system provides a LED that is mounted to the front steering mount cover to indicate the status of the system. The alarm also has a feature that allows you to know if the alarm has been triggered while you were away. When the alarm is turned off using the remote, the the horn will sound for a long beep and a short beep if the system has been triggered. If it has not, the alarm will emit two short beeps. It also features a 20 second delay for the automatic arming feature to give you time to lock the front front fork and the bags before the alarm arms itself.

The power drain on the battery is stated at 0.02 watts when the alarm is armed but not triggered.

Instructions:

The instruction manual for installation of a BMW alarm system for the K75 motorcycle is incomplete an in error in some cases. The dealer was not able to solve the problems with the manual and so you will need just a little more information to complete the installation.

Remove the gas tank by removing the brass retaining clips from the rear of the tank. These clips prevent the tank from sliding through the rubber mounts between the tank and the frame. After removing the clips, lift the tank up and follow the electrical connection from the tank to find the plastic connector. Separate the connector to disconnect the electrical sensors from the tank. Lift the rear of the tank and slide it backwards till you can get to the vapor hoses on the bottom of the tank. Pull these hoses off. Pull the tank back till it clears the front fairing and disconnect the fuel lines from the front of the tank. Have a towel handy to catch the fuel that is in the line at the time and remove the tank. Set the tank aside.

If you have the ABS system installed, you will need to remove the large connector on the side of the ABS computer under the seat. Remove the seat locking bracket using the small hex wrench from the

BMW toolkit. Remove the four retaining screws and pull the plastic mounts off the locking mechanism. Slide the steel bar away from the frame to free the ABS mounting box. Pull the box up and backwards to remove from the bike. This will expose the battery.

The relay box is the plastic box mounted forward of the seat latching mechanism. This box cannot be easily pulled out so just leave it in the bike. Remove the cover.

Remove the negative lead from the battery first, and then remove the positive lead. If you have the original BMW battery, it will have plastic covers over the terminals which can be removed with a small screwdriver.

Free the rear cowling from the bike by removing the four screws under the seat and the two nuts that are inside the cowling. Do not try to remove the cowling completely unless you are willing to disconnect the rear ABS computer and the brake lights.

Finally, remove the covers to your steering mount by removing the two retaining screws in each of the covers.

Make sure that you purchase the long harness (part number 95 00 5 000 120). The K75 doesn't have room for the alarm CPU below the seat and the long harness will reach the tail section. This harness is about $70.00 so you don't want to buy the wrong one and have to remove it after you are half way done.

The instruction manual for the wiring harness is incomplete and has an error that will prevent the alarm from working. Additionally, the suggested routing of the harness interferes with the seat locking mechanism so you will want to do it differently. I also suggest not connecting the battery to to the alarm until you have completed all of the wiring.

Using a 3/4 inch drill bit, drill a hole in the relay box near the starter relay in the rear right hand corner. Be careful not to hit the starter relay and set the hole far enough to the right that when the rubber plug of the harness is inserted, it does not interfere with the latching clip for the cover of the relay box.

Use a 1 inch drill bit to drill a hole through the fiberglass base of the rear cowling. You will want to drill through the rounded area as indicated in the drawings in the installation manual. There are rubber mounts that space the rear cowling away from the frame enough that the harness will not be pinched by the frame for this hole. The manual suggests a 3/4 inch hole, but you will never get the large connector through that size hole.

Find a suitable location on the steering mount cover to drill a 1/4 inch hole. (My bike does not have the heated handgrips so I removed the plug for that switch and drilled the hole for the alarm indicator LED in the plug. I prefer this over drilling a hole in the cover above the key.)

The hard part is done. Feed the dash indicator led through the 3/4 inch hole in the relay box and then feed the rest of the wires through. Feed the round white horn connector through first and the rest should go through easily. There is a small 1/4 inch hole in the front rubber stopper of the relay box. Use a small knife to open up this hole and feed the dash LED through this hold. Feed the brown grounding wire that is pulled out of the LED wire casing through the hole also.

The grounding bolt is on the left side of the center frame tube and about half way between the relay box and the front fork. Remove this bolt and attach the BROWN grounding wire from the harness to the bolt along with all of the wires that were previously connected to the frame. Reattach the bolt.

Route the alarm Warning/Status indicator LED along the right side of the frame with the other cables that go to the front dash. Remove the black metal mounting sleeve from the LED. Simply pull on the metal sleeve while pushing on the LED. The two separate fairly easily. Remove the nut on the sleeve and apply some super glue or thread locking compound on the threads near the end where the LED would be. Insert this through the 1/4 inch hole that you previously drilled in the steering mount cover and secure it with the washer and nut. Insert the LED through the sleeve.

Use a tie wrap supplied with the harness to secure the LED wire to the other wires on the front of the steering column being careful to leave enough slack for the full range of motion for the steering column. Test out the slack by turning the front when across the full range. Use two more wire ties to secure the rest of the wire to the frame down the right side of the bike. Pull the slack back into the relay box to avoid it getting pinched when you put the tank back on.

Reattach both covers for the steering mount. Notice that there are two small plastic ears that hold the rear cover against the front cover. Attach the front cover first and route the cables behind it so that when the second cover is attached, the clutch cable and the throttle cables route through the cutouts provided in the second cover.

Remove the screws for the blinker relay in the rear left corner of the relay box. It has two retaining screws. This will make it much easier to locate and patch into the blinker wires.

1. Locate the blue/black wire which attaches to the left blinker circuit. Connect a 3M blue plastic patch on this wire and connect the blue/black wire from the harness to this connector. (Hint, if you have removed the turn signal relay unit, the two wires for the blinkers are in the corner of the connector and are easy to find when you turn the relay over. Trace these wires to a suitable distance from the relay where the wires have some play and attach the 3M patch connector.)

2. Locate the red/blue wire which attaches to the right blinker circuit. Connect a 3M blue plastic patch on this wire and connect the red/blue wire from the harness to this connector. This instruction is in the manual for the short harness but not for the long harness.

3. Locate the green/black wire which attaches to the +12 volt KEY ON circuit. Attach a 3M blue plastic patch on this wire and connect the green/yellow wire from the harness to this connector. (Hint, locate the brown round auxiliary connector in the relay box. The green/black wire has a terminal in this connector and you can patch onto the wire that enters the connector. This connector has 5 wires coming into it.)

This instruction deviates from the manual. The instructions indicate that the green/yellow wire of the wiring harness be connected to the green/yellow wire of the motorcycle. This is incorrect. The rear of the instruction manual provides a description of the wires and this wire should be connected to the +12 volt KEY ON wire. The wiring diagram for your bike indicates that this wire is the green/black wire.

4. The starter relay is in the rear right corner of the relay box. There is a square plastic connector on the side of the starter relay with a brown/red wire and a black/yellow wire. Pull the plastic connector from the relay. Insert a small screwdriver or paper clip into the plastic shell and release the retaining clip for the brown/red wire. Pull this wire out of the plastic connector. Put the plastic connector back onto the starter relay. Find the brown/red male connector from the wiring harness and connect the brown/red wire that was removed from the starter. Find the other female brown/red wire that is attached to the harness and push it into the vacated hole in the connector to the starter relay.

5. Locate the round white connector for the horn inside the relay box. Connect the mating round white connector from the harness so that the keys in the connector match up.

6. Do not connect the white wire of the harness to anything. The wiring diagram indicates that this wire is an instant trigger, but there is no mention of any connector that the bike would have for this function. The dealer indicated that it should just be left unconnected.

The wiring is now complete for the relay box. Replace the cover for the relay box. The instructions indicate that a slot should be drilled opposite of the 3/4 inch hole in the relay box. However, this hole and the harness will interfere with the seat locking mechanism. Route the wires of the harness from the relay box straight down so that they will go between the relay box and the mounting box (for the ABS if present) below the seat latch.

There are two wires that are about 8 inches long for connection to the battery. Connect the red wire to the positive terminal of the battery first. Then connect the brown wire to the negative terminal. The clock on your dash will have to be set now that power has been restored to the bike..

Remount the ABS box and computer for the front ABS system and resecure the locking mechanism for the seat. Plug the ABS cable back into the ABS computer on the left hand side of the bike.

Route the remaining long cable of the mounting harness under the frame in parallel with the main electrical harness for the brake lights (and ABS system if present). If you press on the shell of the existing electrical wires, you can make room for the new harness such that it is not visible from the outside of the bike or from the inside with the seat removed. Push the plastic CPU connector through the 1 inch hold that was drilled in the tail cowling and secure the wire to the frame using the remaining wire ties. Replace the rear cowling by securing the nuts to the bolts for the tail section inside of the cowling and then securing the four bolts in the area below where the seat will mount.

Find the fuse that was in the same bag as the 3M connectors with the CPU and install it into the fuse holder in the alarm harness. The fuse connector should be about 6 inches into the cable behind the relay box.

Test the system before mounting the CPU and sensor. Remove the rubber cover over the hold in the casing for the CPU. Attach the CPU to the wiring harness. The red light inside the box should blink on and off. If this does not happen, then there is probably a problem in the wiring to the battery.

The red light inside of the CPU case is the logic indicator for the sensor. Jiggle the sensor to verify that it is properly connected and working. (Hint, the wiring to the sensor on my system was kinked inside the box and over time broke through the wire casing. The touching wires disabled the sensor. If everything appears to work properly but the sensor doesn't function, you can open the CPU box by removing the four screws and examine the wire. It clips onto the circuit board for the CPU and can easily be removed for repair.)

Synchronize the CPU with the remote transmitter. The instructions for the alarm are incorrect for the synchronization. You must hold down the red button inside the CPU box till the light on the dash turns red (about 5 seconds) and then while holding down the button, press the first button on the remote transmitter. The alarm will then flash the light on the dash to indicate that it has synchronized. Follow the test procedure in the rear of the manual to verify that the alarm is operating correctly.

Follow the directions in the manual for attaching the double sided tape to the CPU and to the sensor. The sensor can be mounted such that it is parallel to the frame or perpendicular to it. I chose to mount it perpendicular such that it is on the inside right side of the rear cowling just above where the harness enters the cowling through the 1 inch hole. Mount the CPU to the inside top surface of the rear cowling. If you have an ABS system, you can mount it to the bottom of the ABS mount.

Reattach the fuel tank by sliding placing it over the engine and frame. Attach the fuel lines to the front and then slide it into place. Lift it up slightly and attach the fuel vapor lines. (Hint, it is common practice for the BMW dealers to replace the vapor lines with a vapor box outside of california so don't be alarmed if you do not have the vapor lines.) Double check to make sure that you did not kink the lines and that the lines connect to the front of the crank case. It is easy to pull these off of the front of the crank case. Reconnect the electrical connector for the fuel tank to the electrical system of the bike and push the tank back into place. Push down on the tank so that the rubber mounts push through the fittings on the frame. You may have to use a screwdriver to help them through the frame. Finally, attach the retaining clips to the posts.

Close up the compartment in the rear cowling, attach the seat, and you are done. Retest the system to make sure it works after you have reassembled the bike.

Just one final note. The wire that connects the sensor to the computer for the alarm appears to be very sensitive to kinks and stress. Be careful to make sure that the wire does not vibrate freely and is not under any strain.

Installing Motorcycle Fork Gaiters

Installing Fork Gaiters on a 1994 BMW K75 By Rick Korchak

Fork gaiters are a curious motorcycle accessory. Somehow, the accordion-shaped tubes made a motorcycle look instantly old-fashioned to me. Compared to the old Earle's forks, which look like they could hold up the front end on a tank, the spindly tubes on the later /2 model BMW's of the late 60's look downright weird when covered in their collapsible rubber gaiters.

About 30-odd years later, I became convinced that gaiters might be a good thing by a couple of friends who swore by them. The claim is that they protect the bare metal of the front fork tubes from damage by stones, bugs, dust and other debris. This, in turn, helps protect the all-important fork seals. When I saw a pair installed on a K75 identical in every other way to mine, I liked the look - the black gaiters covered the shiny chrome upper fork tubes and helped to blend in the blacked-out look of the rest of the charcoal black bike. So, there was now an overwhelming argument to install a set! Style and performance!

I had a bit of difficulty finding the correct set of gaiters. I was told (but haven't confirmed) that BMW no longer carries them for a K75 or K100, so you have to find them in the aftermarket. I finally found a pair of unlabeled but substantial looking (and feeling) gaiters for about $30.00 the pair at Bob's BMW. I was told there used to be special black clamps available to hold them on top and bottom, but they were no longer available, so Bob threw four black plastic cable ties in the bag and said they would work fine.

I finally got up the energy one Saturday to do a front-end teardown and install them. I looked over the bike and pulled out the Clymer's to study the situation - it looked like a fairly straightforward job to me. There are a few tricks though, and hopefully you can learn from my mistakes.

The job consists of four basic steps: you need to pull off the front brake calipers, disassemble the front fender assembly (which is a two-part affair on the '94 K75), take off the lower fork brace, loosen the forks and pull them out. Although I had taken the front calipers off once to change the front tire, I never had the front forks all the way out, but it really isn't too hard of a job at all.

What You'll Need

- 5, 6 and 8 mm Allen wrenches (I use a nice set of 3/8" drive Craftsman metric Allen sockets);
- 3/8" drive Ratchet wrench;
- Torque wrench;
- 10 mm box wrench;
- Pliers;
- I needed a longer 3/8" drive breaker bar to loosen the bigger (8 mm) Allen bolts;
  WD-40 or equivalent;
- Loctite (or equivalent) thread sealer.

- Optional: black silicone RTV; hydraulic scissor jack.

Time
I worked slowly and methodically (which doesn't necessarily help me get the job done any better!) and took several breaks and it took me about 3 hours total.

Before	After
	

Reference
I have the Clymer "K-Series 1985-1995 Service, Repair and Maintenance" guide, Second edition, 3rd printing, April 1999. Published by Intertec Publishing, ISBN 0-89287-648-4. The chapters to refer to are:

- Chapter 10, "Front Suspension and Steering". Pages 354 - 357 cover removal and installation of the front wheel, including removal of the front brake calipers; and pages 375 - 378 cover removal and installation of the front forks;
- Chapter 13, "Frame, Body and Frame Repainting" cover the removal of the front fender on pages 496 - 498.

The Job
I set a hydraulic scissor jack under the engine with a piece of 2x4 between the jack and the bottom of the engine and lifted the bike up just enough to take some weight off the front end. I feel that this stabilizes the bike a bit whenever I'm going to remove the front tire; I'm not sure I trust the center stand 100%. I find this makes it a bit easier to slide the front wheel out when working on the front end, but it probably isn't really necessary. If you do this, make sure you don't lift the bike off the center stand - just a tiny bit of lift to help ensure the bike won't fall forward is all you need.

Also, before you start, you should measure the length of the forks; I measured mine from a point on the bottom of the lower fork bridge to the bottom of the fork. There is a nice, flat area on the very bottom of the fork on which you can lay a straightedge ruler to measure to. This measurement will be used as a check when you are reinstalling the forks to make sure they are the same length as when you took them out (see step #9).

1. Remove the Brake Calipers
First thing to do is to remove the front brake calipers. This is pretty straightforward and covered nicely in Clymer's. You remove the two 8 mm caliper mounting bolts and slide

the caliper off up and to the rear. There are two cautions here: once you take the calipers off, do not touch the front brake, or the pistons may be forced out of the cylinders leading to potential problems. I didn't do this, but Clymer's recommends you fit a piece of wood or plastic in between the brake pads to hold them in case someone touches the front brake. I used caution and it worked well for me. You'll find that you have to swing the front end back and forth a bit during this job, so make sure you don't reach up without looking and squeeze the front brake by accident while the brake calipers are unsupported!

The other thing to remember is that you will need to use something to hold up the brake calipers - you don't want to let them hang by the brake lines. I have two thin nylon luggage straps that I use specifically for this purpose - I wrap them up around the handlebars, then feed the strap up into the caliper between the brake pads, and adjust the straps so that they take the weight off the hanging calipers. I purchased them in Wal Mart for about $2.00 each; they are in the auto section near the bungee cords. They work great for this single purpose.

2. Remove the Front Axle

Next, remove the front axle. This involves loosening (no need to completely remove) the 6 mm front axle clamping bolts (2 on each side) from under the axle. Then remove the 8 mm bolt that holds the axle on the left hand side of the bike. Insert a drift or an Allen wrench into the hole in the axle on the right hand side of the bike and slowly pull the axle out while rotating it.

3. Remove the Front Wheel

Once you have the axle out, you can slowly pull the front wheel forward to remove it. There are two wheel spacers on either side of the wheel, and they will probably fall out when you remove the wheel. Remember that they are different shapes and must be installed the same way they came out, so take a look first to see how they fit. Move the wheel out of the way, but don't lay it down on the disc rotors.

4. Remove the Front Fender(s)

Next, you'll need to remove the front fenders and the lower fork brace. I have the two-part fenders on my 1994 K75 Standard. To do this, first pry off the small hinged cover on the back of the fork brace. Be careful, as this cover is pretty flimsy! Under that cover you'll see an Allen bolt - I think it's a 5 mm. Remove that bolt and washers. Next, remove the reflector assemblies from the side of the front forks. Refer to Clymer Chapter 13, starting on page 496.

Note: I found this to be the trickiest part of the entire job: there are several washers involved here that make this a rather complex assembly that holds the reflector and the front half of the front fender. There are two tabs that come down from the fender that slide over the bolt and there are various sizes of washers and a collar that hold everything together. Make sure you understand how they all fit together before you take them out! I didn't, and it took me some time to figure out how everything went back together. I'm still not 100% sure I did it right, but it seems to be working. Clymer's warns that if you don't get it right, you may risk breaking the tabs on the fenders, which means you'll have to buy a new fender AND get it painted! Also, when you get to a point where the bolts are loose, hang on to the front fender, or it will drop off and probably land upside down and get scratched.

5. Remove the Lower Fork Brace

You do have to remove the lower fork brace. Initially, I thought perhaps I could get away without doing this. To remove the lower fork brace, remove the four (yes, there are four!) 6 mm bolts under the fork brace. You should now have two naked forks staring at you, ready for removal!

6. Remove the Front Forks

Pry off the top trim cap on the forks - they are up on top of the "triple tree" under the handlebars. Loosen (it's not necessary to remove) the upper and lower fork clamp bolts; they are the Allen bolts in back of the forks, one on the upper fork bridge (6 mm on my bike) and one on the lower fork bridge (8 mm) in back of each fork. Refer to Clymer page 377. Slowly slide each fork down and out. You may have to twist the forks slightly back and forth as you remove them. They should come out fairly easily - if not, first make sure that they fork clamp Allen bolts are, in fact, loose. If you are still having problems, you may need to spray some penetrating fluid around the forks inside of the upper and lower fork bridge.

7. Clean the Forks

Now that the forks are out, you should make sure they are as clean as possible. I sprayed WD-40 on a clean towel and wiped them down. I also cleaned out the holes in the upper and lower fork bridge holes where the fork goes. I then left a very light coating of WD-40 on the part of the exposed fork tubes that will be covered by the gaiters. I suppose that if you haven't done a fork oil change in a while, this might be the time to do it; perhaps it is easier when the forks are completely removed from the bike.

8. Install the Gaiters

Slide the gaiters over the forks. Make sure you have the large diameter end down, as this must slide over the fork seal assembly. It's not necessary to do anything other than slide the gaiters over the forks at this point; you have to reassemble everything before you can cinch down the gaiters. Note that there are four drain holes in the bottom of each gaiter. You may want to locate these so that they don't point directly forward - best to have them on the sides, I figure, to prevent dirt or rain from getting in. Remember that once you get the bottom part of the gaiters on, and you install the fork brace, you probably will not be able to move them again, as it is too tight of a fit to do this once the fork brace is on, so get them lined up as closely as possible.

9. Reassemble the Forks

The half-way point! It's downhill from here…. I sprayed a bit of WD-40 in the holes in the upper and lower fork bridge where the forks are installed to prevent future corrosion. I suppose I could have put a very light coating of "Never Seize" instead. Slide the forks back up into the fork bridge. This is a good time also to clean up everything on the front end; the forks; under the fenders; the lower fork brace, etc.

I decided to move the forks up above the triple tree by 5 mm, just to see if it would speed up the steering a bit. This did work, as I will relate at the end.

If you are going to reinstall the forks to factory specs, simply slide them up into the upper and lower fork bridge until the top of the fork tube is flush with the top of the triple tree. You may need to lay a small straightedge on top of the triple tree to tell when you are there. Be careful, as it may appear that the forks are flush with the top of the triple tree when they really aren't. Check the measurement you made at the beginning to determine if the forks are in the same location as before.

Now you should snug up the forks just enough to hold them in place, and pull the lower part of the fork gaiter down over the top of the fork seal assembly. You want to do this now, because it is a very tight fit once you get the fork brace on. I pulled the gaiter down far enough so that the bottom of the first pleat was even with the very top of the fork, right before it meets the fork seal itself. You need to make sure that there is enough rubber over the lower section of the fork so that when you install the cable tie it will have something to grab on to and hold the lower part of the gaiter on securely.

It gets a bit tricky when you're trying to juggle the forks and the fork brace - you may have to mess with a combination of holding the forks up and fiddling with the lower fork brace to get the brace installed in the proper position as you reinstall the forks. You have to slide one fork down lower than the other to get the brace in, then move the fork up until everything is lined up. You need to have the ability to rotate each fork as you slide it up into the fork bridge, but at the same time, you need to make sure the lower fork brace is in its proper location. You sort of have to go back and forth until you get the right combination of moves where both forks and the lower fork brace are all lined up! It's kind of tough to do by yourself - I eventually had to call my wife out to the garage to give me a hand.

Also, you should make sure nothing is binding at this point. You don't want to force the fork or the assembly with the fork brace; make sure everything has a bit of play or is not binding. This may take some doing.

Once you get things lined up, tighten the Allen bolts in the upper and lower fork bridge just enough to keep the forks from sliding down. I had to do quite a bit of measuring and tweaking to get everything lined up and correct, as I moved my forks up 5 mm above the triple tree. Then, tighten the four bolts under the fork brace. Make sure you torque these; Clymer's calls for 14-16 ft. lbs.

10. Reassemble Front End
Now it's a matter of reassembling everything pretty much in the reverse order from the way you ripped it apart. Reassemble the front fender(s), ensuring that you install the washers correctly on the reflector assembly. Reinstall the front wheel, then the brake calipers. Make sure you double check everything to ensure you torqued everything to specs; don't forget the fork clamping bolts on the upper and lower fork bridge!

11. Finish Installing Gaiters
Make sure the lower part of the gaiter is secure around the upper part of the lower fork tube, and that it covers the fork seal with enough room to slide in the cable tie. It is a very tight fit between the gaiter and the fork brace; I used a pair of pliers to slide the cable tie back and forth until I was able to get it far enough down to tighten. Don't cinch the cable tie tight yet, just let it hang there until you make sure everything is located properly. I stretched the gaiter up to the top of the fork, right underneath the lower fork bridge, just to make sure everything looked right, before I cinched down the gaiter.

Once everything looks good, you can cinch down the lower cable tie. Make sure you adjust the cable tie so that the little female part is at the back of the fork; this gives a cleaner look to the front fork.

Stretch the gaiter up to the top of the fork tube under the lower fork bridge. This may take some persuading with a piece of wood - don't use a screwdriver, as it may cut the fork gaiter and ruin your work! Push the gaiter up as far as it will go and make sure it's even. You should be able to get it up far enough that you see no chrome or fork tube. Once it's in place, wrap it with a cable tie and again, make sure it's located such that the female part of the cable tie is in back of the fork.

I used a pair of pliers to pull on the cable tie to make sure it was really tight. I then snipped off the extra part of the cable tie that stuck out. Everything looks great!

You may want to put some black RTV sealant around or under the upper part of the gaiter where it meets the lower fork bridge. I didn't do this, but I wonder if it would have helped hold the gaiter up. I'm assuming that the cable tie is tight enough to hold it for a long time.

I have heard that raising the forks in the triple trees can help to quicken the steering by slightly decreasing the trail. I wanted to try this; since installing Dunlop K491's, the steering seemed a bit slow - the bike almost seemed to "understeer", or plow, a bit in the corners. When reinstalling the forks, I only raised them 5 mm, which wouldn't seem to make that much difference. In fact, some people say that it really doesn't make much of a difference on some bikes to raise the forks. But I definitely noticed an immediate difference. As soon as I pulled the bike out of the driveway, it seemed to steer much quicker. It may be that the 5 mm was just enough to overcome the slightly slower steering of the Dunlop's. The bike now feels like it turns in as quick as it did with the original Metzeler's, but without the feeling that the Metzeler's gave me that the bike was "falling in" to corners. I always felt like I had to give the bike mid-corner corrections with the Metzeler ME33/55 combination.

UPDATE: I recently installed the lower K75 "C" handlebars on this bike, which has made a huge difference in the way the bike "feels". I then tried again to raise the forks in the clamps, this time by 1". Combined with the newly improved front end feel, raising the forks has just about eliminated the top-heavy, "tippy" feel the K75 has at low speeds. See more on the page that describes the handlebar conversion...(**more**)

The End
Again, make sure everything is torqued to specifications! Clymer's calls for the following on the K75, but check your bike to make sure you know the exact torque specifications:

- Front axle 8 mm Allen bolt 21-27
- Front axle 6 mm clamp bolts 9-13
- Front caliper 8 mm mounting bolts 21-25
- Fork bridge clamping bolts
- Upper 6 mm 14-16
- Lower 8 mm 29-33
- Fork brace bolts 6 mm 14-16

Remember, this document is to be used as a guide only! Please make sure you read the BMW technical manuals and the Clymer's or Hayne's guides before doing any work on your bike. The front end, forks and front brakes are critical components to your bike and your safety. Make sure you check and double check that everything is installed correctly and torqued to proper specifications.

Install Fork Gaiters

By Jon Diaz
February 1996

Scott Adams says:

>I am looking at putting fork gators on my KRS but am running into
>some snags. Am I really going to have to remove the brake line and
>ABS sensor line in order to drop the forks through the triple clamp?

Snip the cable ties that hold the ABS sensor wire to the brake line. You will have to pull the fork brace cover off to get all of them. Pull the sensor at the wheel by removing the two allen bolts holding it to the fork tube, and move it to the side. I would pull the brake calipers at this point also and move them aside.....you might have to pull the back half of the fender because I can't remember how the K-RS brake lines are routed.

Remove your engine spoiler, and slightly jack up the front of the bike. Do not use a plastic bucket to hold your bike up as we did with Dave Soine's K1100LT in my garage. It was scary. :) Pull the front wheel, and take the fork tubes off as a pair after loosening the pinch bolts. I did this by sitting on the floor directly in front of the bike, and pulling the tubes down into my lap.

The SECOND those tubes clear the bottom triple tree, put the boots on (correctly oriented with the fat side down!!), and get the tubes back in as quick as possible. A strong helper is definitely recommended here.

Secure the boots and sensor wire with cable ties/clamps (make sure you use the clearance shim when reinstalling the ABS sensor!), replace the removed parts, and re-torque everything.

Staintune Exhaust Installation Guide on BMW K1200RS

By: Bill Wright
October 1999

Background First off, I consider myself a competent shadetree mechanic. I do most of my maintenance and repairs on both my bikes and autos. By no means am I a certified BMW (or any other brand) mechanic.

The only "special" tools I used for this install were an Inch-Pound/Newton-Meter torque wrench and a T-50 Torx head socket. Staintune says High Temp Silicone Sealer may also be used. You will also need 4 new exhaust manifold gaskets (11-62-1-464-061 ?) from BMW.

In my opinion Staintunes' instructions were very limited. What caused me the biggest problem is when I took the header pipes out of the box, only one of the four header pipes going into the "collector" were welded. Of the other 3, 1 was very tight, 1 very loose and, like Goldilocks, 1 was just right. I found out later this is as designed, it's intended to give the exhaust the ability to expand and contract. Staintune gives you the option to use the silicone on these joints. I would avoid it. You would need to move the header pipes too much to get the silicone in and getting them re-positioned was a pain. Otherwise, installation was relatively straightforward.

1. With the bike on the center stand remove the belly pan and seat, I also chose to remove the shield between the exhaust and toe shifter, it's only 2 bolts and gives you more room to work and less chance to scratch the new pipe.
2. Remove the Oxygen Sensor from the stock pipe, I needed an additional 6" of cable length to reinstall in the new pipe so you may want to cut the cable ties under the seat that support this cable and get the extra length now, I just had to reposition the cable connector.
3. Remove the 8 combination hex/torx nuts holding the exhaust to the manifold, it's not uncommon for the studs to come out with the nuts, don't worry about it, then remove the rear mount. *** DON'T FORGET TO REMOVE THE 4 COPPER WASHERS INSIDE THE EXHAUST MANIFOLD, they may be hiding and will most assuredly be stubborn about leaving.
4. Fit the new header system. I put 4 small dabs of silicone sealer on each of the exhaust gaskets to make them stay in the manifold while fitting the headers. Slowly and evenly snug up the nuts, DO NOT tighten yet. I took it very slowly, tightening the nuts in a rear-to-front pattern in very small increments until snug. Reinstall the oxygen sensor and tighten.
5. Put the clamp over the muffler and slide the muffler onto the collector pipe, then attach the rear mount bolt. Twist the muffler as needed to align the mounting bracket. I had to use a Dremel Tool to grind the bushing so the muffler hanger would seat. You could grind/file the hanger hole on the muffler instead.
6. Start at the front of the system and working your way back, incrementally tighten all nuts and bolts. The final torque spec on the headers is 22 N-m (apx. 16.2 ft-lbs) but PLEASE double-check those figures. (I tightened mine in 7/14/22 N-m increments)
7. Wipe the system clean of all grease/oil and silicone, (I use Windex) then wipe it again.
8. Start the bike letting it run for a few minutes and check for exhaust leaks. Shut down.
9. Reinstall the toe shield, belly pan and seat. Double-check your work.
10. Now, get on your bad motorscooter and ride...and enjoy a new authoritative sound.

From: diaz@cae.cig.mot.com (Jon Diaz)

Subject: Re-keying K saddlebag locks

Date: Fri Jan 13 1995

Regarding new bags:

I just re-keyed a set of K bags for a friend and its REALLY simple. Don't pay anyone else to do it. I think I did the whole set in less than 30 minutes.

I'll try to explain. Unlatch the lock (open position) and put in the existing key that works. Using a paper clip, depress the end retainer tang that holds the lock cylinder into the plastic latch housing (I curled the end of a paper clip and it worked fine). Its a blind operation, but after you do it once it all becomes clear. The lock cylinder should slide right out.

Remove the old key, insert the ignition key, and file down the pins that stick out until they are flush with the cylinder housing. The material is soft, and you don't need a lot of pressure to grind away a bunch of material. Then wipe away the filings, grease the outside of the lock cylinder housing, and re-insert into the latch housing. It only goes in one way.

If this operation sounds too difficult, do what I do: practice on other people's bikes! :)

Jon Diaz
diaz@cae.cig.mot.com
Day: (708)632-2919
Nite: (312)685-9219

How to Re-Key your Integral Saddlebag Locks

Let's say that you got a set of second-hand saddlebags. Or perhaps you've updated the bags on your older K-bike, replacing the old latches (with that wretched flat key) with the new-style locks. Or you bought the bike used and it came with different keys for the igntion and the saddlebags. Either way, you want to re-key them to all be the same.

It's a really simple operation, except that you have to do the tough part of it blind. First, unlatch the lock and put in the key that came with it. Using a dental tool or bent paper clip, depress the end retainer tang that holds the lock cylinder into the plastic latch housing. It's a blind operation, so you just have to feel around until you hit the top of the tang. (The first one you do is definitely going to be the toughest.)

As you depress the tang, pull the lock cylinder out. If it starts to move and then hangs up, you've probably got your tool inserted into the slot in the lock cylinder along with the retaining tang, so gently wiggle the tool free while maintainng outward pressure on the cylinder. The lock cylinder will then slide right out. Once you've removed it, there are only 5 more to go!

Whatever you do, DON'T take the key out of the lock! First, wrap some tape around it (unless of course, you like chasing all over the place for the pins which will come flying out when you remove the key).

There are two ways of dealing with how to re-key the lock to fit your needs.

- The most elegant is to take them to a locksmith and have him rework it to fit your ignition key. Most likely he won't have the pins you need in stock, but he can usually swap the existing ones around to make it work.
- If this isn't the case, you can (sort of) do it yourself. Insert the ignition key into the lock and remove the tape you wrapped around the whole mess. Take a file and very gently, file down the protruding pins. Clean all the filings out of there and regrease it (petroleum jelly will probably work just fine)

Once you've done that, re-installation is simple: just push it into the lock housing - with the key inserted - until it clicks.

Changing a Top Case Lock

By: Brian Curry

This definitely applies to the BMW 22 Liter Top case. The info also applies in general to a lot of the locks BMW currently uses.

First how the lock operates and is retained:

When the key is inserted the "tumblers" (actually flat metal tabs) are pulled in so that the lock barrel can be rotated. Using the key slot end closest to the edge as a reference, the 3 o'clock position is unlocked and the 6 o'clock position locked. (This places a tab on the end of the lock in a position where an internal post prevents the Top Case latch button from being pushed in.)

In addition to the "tumblers" that lock the lock, there is an "extra" tumbler that keeps the lock barrel in the lock housing. To remove the lock, this tumbler has to be pushed into the lock barrel so the lock can be extracted from the housing. The tumbler is pushed into the barrel from outside the lock. Check the description of how to remove the locks from the K Integral cases or the R11 cases for evidence of this. This seems to apply to all locks that have the flat sheet metal face and a spring loaded flap over the key insertion slot.

While all the locks look the same, apparently they were produced by several manufacturers to a specification. This means that while they are similar, they are not exactly the same. (e.g. Multivario bags were made in at least 5 production runs with different zippers in each one.) Tumblers/tabs from one lock may not fit in another. I know this from experience.

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Now removing the lock:

Rotate the large nut inside the case counterclockwise looking at it, fiddle it off and fiddle the lock out.

Looking at the hook end of the lock, on the right side just at the beginning of the threaded area, there is a small circular flat area with a hole in the center.

Make sure the lock is in the "unlocked" position.

Use a 1/16" diameter rod (allen wrenches will work fine.) and shove it in ~3/8-7/16 of an inch into the hole. This depresses the lock retaining tab (extra "tumbler").

Using the key, rotate the lock 180 degrees, 1/2 turn, counter clockwise. This positions the retaining tab in a slot where it can be removed.

Pull the lock cylinder out. This does not require major amounts of force.

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Now you can swap the tumbler/tabs around to match your key.

Butch Hays has an excellent page describing how to do this with pictures. Here is some additional info.

To lock the lock the tumblers/tabs are pushed out of the barrel by small springs. These springs will be very hard to find if you loose them in the carpet. :(:(Put some grease on the barrel to retain them, if there is not some there already. The tumblers/tabs are retained in the barrel by deforming the barrel over small protrusions on the side of the tabs. You will destroy the barrel deformation to swap the tumblers/tabs. To keep the tumblers/tabs and springs in the barrel as you put it together put some grease in the slots. It will keep everything in place until you have the barrel in the lock body.

If you are having a locksmith do the work for you, this information will make his job much simpler. Locks are puzzles. This provides some information on the puzzle and gives him a starting point.

Retro Fitting Heated Grips to a 1990 K100RS

By Frank Sturzaker
sturzake@netcomuk.co.uk

I wanted to get some heated grips for my bike but wasn't prepared to pay out £180 ($280) for a new set. I bought some used grips from a breaker, fitted them and I am very happy with the result.

The new set would have included the grips fitted to a new set of handlebars. As far as I can tell, the new bars would have had the necessary holes in them with already routed wires together with the special bar end weights needed for grips. On the later model bars, a different arrangement exists with a different type of bar and end weight. This information below is for (I believe) the earlier type of bar.

The parts needed from a breaker are the two grips (plain left hand and throttle grip right hand), the 2 other pieces of wiring loom (the fascia switch plus the connection into the main loom) and two replacement bar end weights. I paid £50 ($80) for the component parts. Before you leave the breaker, do a simple continuity test on the heated grips (battery and bulb or voltmeter) to make sure they are in good order. Fitting them and finding one is not working is not good!

First, remove the existing grips. The end weights are removed by loosening the hexagon headed screws through the weights. They will pull off after this although they seem difficult - there are some O-rings which grip the inside of the bar. The Left hand grip is simple although it may be necessary to cut through a rubber or foam grip if it has been glued in place. The right hand (throttle) grip is more complex requiring the removal of the throttle cable from the grip. On the 16 valve K this is done by removing the single crosshead screw holding the throttle cable cover in place under the master cylinder. Then there are 2 other crosshead countersunk screws which fix the grip to the throttle plate. These are under the inboard end of the rubber grip and are difficult to see and hence to remove. They run from the grip pointing inboard into the throttle cable plate. Removing the cable should then leave the grip free to be slid off the bar.

Most work involved (time wise) is around routing the grip wires through the bars and out of a hole which needs to be made in the existing bars. I removed the fascia (switch) panel (2 hexagon headed screws), removed the 4 bolts through the bar clamps and simply rotated the bars enough to give access to make a 0.5 inch by 0.25 inch slot in the centre of the bars in the underside. It would be easier to remove all the switches, controls and master cylinder to allow the plain metal bars to be taken off and worked on a bench but this is not necessary. It is just a matter of making a hole (or two) and filing it to an approximate size. An assistant (such as a wife (in my case), girlfriend, offspring or partner) is a great help in holding the bars while this work is done. The larger the hole, the easier it is to thread the grip wires later.

Now to fitting the grips. The wires from the grips are thin and easily damaged especially where they go from the grip into the bar. The new end weights have a hollow core through which the wires (one brown, one black) must be threaded before threading through the bars. Each of the pairs of wires needs to be threaded down the handlebar to come out of the new hole made in the centre of the bars. I used a piece of cotton thread and a small metal nut (from a bolt) tied to the end of the cotton to thread the path in the first place from each grip. Letting the nut fall (or slide) under its own weight to the newly made hole in the bars (with a little shaking of the bars) is an easy way of making a way through the bars. Once the cotton was through, I pulled a thicker piece of nylon cord through (by tying it to the cotton) and eventually pulled the wires through by fixing them to the cord with insulating tape. If you have been given the female spade connectors attached to the grip wires, they may be a little difficult to thread but not impossible. If at first you don't succeed, have a coffee (or perhaps a beer) and try again. It does work eventually.

Once the first end of the wires from either (or both) grips is through, feed the remainder of the wires through. Don't just pull from the middle of the bars, push from the grip end whilst pulling from the centre. It will be obvious when you need to start to slide the grip on to the end of the bar. At this point be careful not to push the grip on to the bar too far - you will damage the wires as they come out of the grip on the end of the bar.

When the grips are on the bars far enough, it may be necessary to move the other switch units outwards on each bar to meet the inboard end of the grips. On my bike I had to move each one about one eighth of an inch outwards to ensure that the wires from the grips were not chaffing on the bar end especially the throttle which moves a lot. The switch units are held in place by a single clamping screw. The left hand grip is fixed on the bar by drilling a suitable size hole into the bar through one of two countersunk holes through the inboard end of the grip and inserting a countersunk self tapping screw into the bar. This can be tricky (bad experiences) if the hole is really a bit tight for the screws available. A tight self tap is not vital and be careful not to shear the head of the screw as it bites into the bar metal.

You should now have both grips fitted to the existing bars. Again, a simple continuity test at this point will save more re-work if you have damaged the wires or grips to this point. Route the grip wires forward and round the steering head. Replace the bars on the bike and clamp in place. Re-fit the throttle cable, insert the bar end weight caps and tighten them.

Fit the 3 position switch into the switch panel. Route the switch lead with the grip wires forward and down to the main left hand loom which disappears under the tank. At this point it is necessary to lift (but not remove) the tank. By lifting the rear of the tank from its locating positions on the frame and gently easing it backwards, it can be lifted away from the frame giving access (from a kneeling position) to the looms under the tank. An assistant is necessary to hold the tank away (resting most weight still on the right hand frame member) whilst you access the loom.

In the loom is a connector to match the one on the 3rd piece of the grip wiring. It is about half way along the loom under the tank. It is a T connection. Push the connectors together and then fit the grip wires into the 4 pin connector on the grip loom. This connector at first seems to have 5 wires going into 4 pins from the back. It is actually 2 black (earth) wires and one live (brown) which then feeds the fourth pin from the third pin. Use female spade connectors on the end of the grip wires to connect into this 4 pin connector - black to black, brown to brown.

The last connection should be the switch wire to the grip loom - this will only fit one way round.

Route the grip looms and other wires out of the way under the tank. Some small cable ties make a neat job of attaching the grip wires and loom to the main looms. Re-fit the tank. Re-fit the switch panel.

Test the grips by switching on the ignition and using the 3 position switch. My switch is off in the middle position with low heat when rocked towards the rider and high heat when rocked away. I am told that there may be other variation on this although I don't know.

Integral Bag Repair

By Jonathan Jefferies
March 1995

Mike Clark asked about Repairing BMW Side cases:

Can any president out there offer a suggestion for gluing a broken segment of a BMW side case? I have a half dollar size hole and matching section (approx the size of a 50p coin for those in the U.K.) of one of my side cases that needs to be glued together. This is on the black plastic cases that go with a '93 K75S (cases manufactured in '92).

The case appears to be made with ABS plastic (sez "ABS" on the inside.) I tried ABS solvent weld cement, the kind used for ABS pipes and fittings, but it was inadequate.

Ah, yes the side cases. We need a super FAQ about these. I assume you mean the saddle bags, aka side cases, aka hard bags as opposed to the side panels that are actually on the bike. I have found by experimentation that there are possibly two different plastics or two variants of the same plastic. I have had some luck with the outer case using PVC/ABS glue. The inner case - the part that hangs onto the bike - does not respond well and it's usually the piece that breaks. Anyway it can be plastic welded. This requires the use of a soldering iron with a flat tip - available from Wellar Industries. The professional versions have a temperature control rheostat. And requires the use of plastic welding rod from the Urethane company, 1-800-633-3047 There are 7 different types of plastic rod/stock and costs range from $14-$24 /30 feet of rod.

Now that said, unless you're a confirmed "do-it-yourself" person, that you go to the local bike shops and ask for someone who can do plastic welding and pay $25 or so to have a skilled person do it. But this is an art form and you need to scout around to find an "artiste" type.

Jonathan Jefferies (jeff@Mri.com)

By Tracy DesLaurier)
September 1995

Regarding plastic welding/repairs to your bike parts:

K-bike bags are made from two different types of plastic - the inner sides High Density Polyethylene (HDPE), and the outers Acrylonitrile Butadiene Styrene (ABS). Don't try to repair them using the same materials. HDPE needs to be welded by using a device similar to a hair dryer, but it provides a much hotter and more directed source of heat. The heat gun may force air through it while warming up or cooling down, but it is imperative that the air supply be switched to nitrogen before attempting the weld or it will not stick properly.

The ABS side can be repaired using a "bodied solvent", but this type of repair is probably suitable only for very small holes, or to reinforce an area with another piece of ABS stuck to its backside. ABS can also be hot air welded, and nitrogen is not absolutely required, but better results are achieved by using it.

Three years ago I had a bag fall off on me and repaired it myself using these techniques at my dad's plastic business. The bag is holding up 100%. BTW, for repairs to fairings, do not use these techniques, as they are primarily fibreglass. Use conventional fibreglass repair techniques, but substitute epoxy resin for polyester resin on major repairs.

Heated Grip Install Added Notes

By: Ted Verrill

Well, not only did I do the heated grip install on my K75S, I just did it last weekend on my K1100RS. Here are some notes to add to the directions that come with the kit.

Add to your tools:

- Rough Grit Sandpaper
- 3' length of string with something (like a spare screw) to tie around one end using a figure-8 knot.
- VERY small, flat-head screwdriver like the one that comes with some toolkits
- Dielectric grease
- Leatherman (for cutting off grips, snipping zip-ties, etc.)

Kit Parts to check for:

- 2 grips with wires attached
- various screws (2 to anchor the left, the right depends on whether you have a 16 or 8-valve k)
- small white "lock block" that the ends of the wires plug into
- switch
- pigtail with three connectors (one for the switch, one for the lockblock holding the grip wires, and one either to the power lead or to a second pigtail that goes from the first pigtail to the power lead.)
- bunch of zip-ties
- random other stuff.

Others may disagree but this is what has worked for me on my K Bikes (twice ;-) The directions are quite good, though I would add:

- Disassembly
  1. Remove your seat and slide the tank back, no need to remove it.
  2. Be careful with the brake master cylinder, wrap it in a towel so it doesn't leak on the bike
  3. When you cut off the left grip, sand down the bar so the grip assembly will slide right off.
  4. When feeding the wires through the bar, use the string with a screw attached (with gravity's help) to feed from the center hole out to the bar end. Make sure you remember to go through the grip assemblies first when pulling the wired back through (Doh!)
  5. When you cut zip-ties, leave them in place to make sure you can replace with new ones in the correct place.
  6. The wire connections at the ends of the grips are VERY fragile, when feeding the wires through the bars make SURE not to pull too hard :)
  7. Do NOT cut your finger with the leatherman (DOH!)
- Wiring
  1. The power lead is WELL HIDDEN under the main harness running up the left hand (clutch) side of the frame. Make sure you look for this little sucker, the lead is only about 1/2" long sprouting from the harness, is often underneath the harness, and terminates in a 2-prong plastic connector.
  2. Use dielectric grease on ALL connections
  3. Use the little screwdriver to *slightly* ease open the ends of the 4 spade slides at the end of the grip wires before inserting them into the block connector. If you don't, they will just pop right out of the block when you try to plug it into the pigtail. They might do this

anyway, so you may have to use that little screwdriver to "push" them back into the connected block and onto the spade connectors in the pigtail switch.

- Reassembly
  1. Make sure to re-zip tie everything back into place - they give you a bunch to use, use 'em all ;-)
  2. Make sure to hook back up the gas lines before flipping on the ignition to make sure they are working properly (doh!)

Enjoy WARM hands :))) Any questions, please let me know!

22l Top Case Installation

By: John Brown
May 1999

(works for Givi too, just substitute the Givi mount in place of the BMW mount)

1. Lift up seat and remove tail storage compartment cover. Remove anything in the storage compartment.
2. Remove right side body panel - you need to get at that edge of the seat. Remove the seat. To remove it, you need to pull two cir-clips, or Jesus clips (you'll know why when you lose your grip on it just as it comes off and it goes shooting off into hyperspace -- Jesus Chr...!), one at the hinge that locks the seat in the upright position, and the other in front on the main hinge where the seat pivots, near the right side panel. Unscrew the two hex head bolts that hold the main seat bracket in place and slide the seat forward then up to remove.
3. Inside the tail storage compartment, on the bottom, you will find two nuts that should have rubber protective caps on them. Pull the caps off. Unscrew the nuts (10mm if memory serves). These hold the rear wheel fender in place - the bracket they screw on to may fall out, no big deal if it does, just set it aside for now.
4. Also inside the tail storage compartment, you will find two large plastic headed bolts that hold the tail-light in place, unscrew these (they should only be finger tight) while holding the tail-light with one hand so it doesn't just fall free when the second bolt is removed. Unplug the wiring harness so you can remove the tail piece from the frame. Since you're there, I suggest spraying the wiring harness contacts with a electrical contact cleaner (or Color TV Tuner cleaner), plug and unplug it a couple times to work the cleaner in, then spray again to rinse any munge out of the connectors. Some people suggest applying dielectric grease at this point, I prefer a product called Rail Zip - available at hobby stores that sell electric trains. It's used to clean the tracks and remove oxide from them (thus the RAIL part of the name). Apply a little drop to each connector and plug and unplug it a couple times to work it in - leave the residue in place to protect the contacts, it should be easier to plug and unplug the connector now. Remove the tail piece from the bike.
5. There are four hex head nuts and washers holding the top and bottom of the tail piece housing together, remove them and seperate the upper and lower pieces. You now have clear access to the inside of the tail compartment!
6. You should see four posts inside the compartment with a detent in the center of each, this is where you need to drill the holes to mount the trunk rack. Approximate the exit hole location on the painted side of the housing and put masking tape over the area to prevent the fiberglass from splitting when the drill bit exits. Also, it is wise to place the painted surface against a wood block to further protect the fiberglass from splintering when the bit exits. Use a 6.3mm (1/4") drill bit and drill a hole in each post through the center detent. Check that the rack mounting bolts can pass through the holes without binding.
7. Remove masking tape. If you received a protective clear sheet, install it. It's difficult to do and not have any air bubbles due to the compound curves of the tail piece. I removed mine after putting it on because it looked awful and I didn't see that it was really going to protect the paint.
8. Take a bolt, put a spring washer on, put a steel washer on next, insert through tail piece, put rubber washer on and bolt into rack. Just thread it on a couple turns to begin with so there is some free-play for the other bolts to line-up with their respective holes. Repeat for the remaining three bolts. I found that only three of my four would line up properly. I ended up going back with a 3/8" bit to enlarge all the holes enough for the bolts to line up properly.
9. Snug up the bolts (no torque value is given) and reassemble in the reverse order. When putting the tail-light back in place, watch that the wires are routed around the assembly so they do not get pinched when you cinch down the two bolts that hold it in place. This is ESPECIALLY true if

you have run-n-lights or other light modification kit installed!

Total installation time is approximately 1 to 1.5 hours.

WARNING WARNING WARNING!!!

The topcases (trunks) have been known to spontaneously leap forth from the mounting rack into deep outer space to hide on the 10th planet in our solar system, which is yet to be discovered by OUR scientists, never to be seen (or heard from) again. I HIGHLY suggest you protect your investment (I believe a new topcase runs $350 US or so) by securing a coated steel security cable to the mounting rack and the topcase - that way if it does break free, it will hang from the back of the bike instead of skipping down the highway.

Telling Time The American Way

copyright 1994 - Joe Senner

Note: this article was written for the Hill Country BMW Riders newsletter and as such isn't really written as step by step instructions like a "how to" probably should be. If you can put up with the flowery jibberish you'll wind up with the basic information, so hang in there.

Everything has its place. You'd think that with degrees in both electronics and computer science, military style time would be the measure of choice for me. Most of the people I know like military time, they either grew up with it or they've been using it for so long it's no big deal any more. Of course, most of the people I know are computer nerds. Military time is great for computers. It doesn't take any extra effort on the computer's part to keep track of 13-23, but it does for me. Not once during my childhood did I hear the words, "It's 2130 hours! You get to bed right now!". I'm 'programmed' to understand 12 hour time plain and simple. Part of what sold me on my '92 K100RS was the attention to the little details that the other manufacturers tend to skip over as 'frivolous' or 'unnecessary'. A clock is one of those little details. As glad as I was to have the clock, I had a hard time adjusting to the 24 hour display. Something had to change, and as you probably guessed it wasn't gonna be me. Besides, I don't usually have trouble distinguishing AM from PM when I'm on my motorcycle.

Clocks are simple things, even if they're stuffed inside an expensive new BMW motorcycle. The hardest part of this project was tearing open the instrument cluster on that expensive new BMW motorcycle of mine. It's quite simple to pull the cluster off the bike, but actually opening it up brought on enough mental anguish to keep me sedated for more than a little while. I won't go into the details of actually getting the clock board out of your instrument cluster, it's a fairly straightforward operation involving pulling out some screws, unplugging a few connectors, and lifting out the tach assembly. With the tach out of the case the clock board pops out by pulling back on a couple of tabs. One note of caution, the chip used in the clock is sensitive to static electricity. It's very unlikely that you'll damage it performing this operation, but it'd be nice if you didn't rub ballons on your head just before you did this. Take your shoes off and you'll be fine.

The clock chip itself is made by Signetics, and is only sold in Europe. When the Signetics field tech told me that last part I began to worry that perhaps this chip was manufactured for a market where 12 hour clocks weren't a requirement. Luckily that's not the case. There is indeed a 12 hour mode for this clock chip. The first step in converting this clock into what I like to call 'normal' time is to identify which one of those 40 little wires (yep, there's 40 of 'em) coming out of that little chunk of black plastic is the one you want. Just like a firing order, there's a specific order to the pins on the clock chip. With the clock board out and ready, hold it so you're looking at the side of the chip with the lettering on it. It'll have a bunch of stuff on it, amongst which you'll find the number '1171'. On one end you'll find a white line stamped across the chip. there may also be a small white dot on one corner of the chip. Hold the clock so that the writing on it is facing you, and the line (or dot) is up. The pin on the top right, that's #1. The pins are numbered down the right side, and up the left side like this (I left out the pins in the middle for this drawing):

```
           ____________
40   --|         o |-- 1
39   --|==========|-- 2
38   --|           |-- 3
       .           .
       .           .
       .           .
23   --|           |-- 18
```

```
am/pm pin -->  22  --|          |-- 19
               21  --|          |-- 20
                     -----------
```

The pin that controls the 12/24 hour format is pin #22. This pin is like a yes or no pin to the clock chip. If it's connected to ground, that means no. If it's connected to positive, that means yes. For this particular chip, 24 hour mode is selected when pin 22 is connected to ground. To convert to 12 hour mode you simply need to connect it to positive. There is one catch, these types of chips don't like to have their inputs connected to full positive voltage (i.e., the main voltage supply should be just a bit higher than the voltage on any of the input pins). According to the Signetics technician, this particular chip would probably be ok if the input voltage was the same as the main supply voltage, it's designed for rough use and harsh conditions, but to be on the safe side a 'pullup' resistor should be used. A pullup resistor is nothing more than a small resistor placed between the input and the main voltage supply to block a little bit of the voltage that gets to the input. The good news is, there's already a pullup resistor on the clock board and as luck would have it, it's connected to pin #23, right next to our all important pin #22.

Keeping track of exactly which pin is #22, flip the clock over and note where the pin is soldered to the board. Follow the thin metal trace that leads from the pin to where it meets up with another metal trace. You'll need to cut this trace between the pin and the connection with the other trace. it doesn't go very far before it meets up with the other trace, only about 1/8" of an inch and the trace itself is pretty thin. Get out your exacto knife and cut the trace. While the trace is thin it's still metal and will require firm pressure and probably two or three passes to cut all the way through. The good part is if you slip and run the knife across another trace you probably won't cut it all the way and make a mess of your clock board. After the trace is cut it's a good idea to take an ohm meter and touch the probes on either side of the cut to make sure it doesn't conduct. Keep in mind that the meter will show that there's a little bit of a connection, like a bad connection on a battery. That's because the meter is reading a slight connection through the chip and back around to the other side of the cut. As long as you don't have a dead short across the cut you're ok.

The hard part's over. Now that you've got the pin disconnected from ground, you need to connect it to positive. Get your soldering iron warmed up and a piece of solder ready. Use a low wattage iron! 15 watts is best, 25 watts is ok, but 30 watts is probably on the high end of the scale. If you don't have a low wattage soldering iron and the accompanying small diameter electronics solder, grab your clock board and give me a call. I'd much rather you used my solder and iron than ruin your not so cheap BMW clock. With the iron fully heated and ready to go, solder pins #22 and #23 together. This is easiest if you just put a dab of solder on the pins where they're connected to the board.

That's it. When you get everything put back together and plug in the instrument cluster you'll have a 12 hour clock. Just to be sure, hit the hour set button and run it through all the hours. Maybe next month I'll get rid of the mechanical analog dials and replace them with digital instruments, yea, that's the ticket...

Luggage Tie-Downs

By: Cary Stotland
August 2000

Just in time for a Daytona-bound adventure, here's a little tip for that next big haul. Tie-down points on a BMW are few and far between. There are a few different aftermarket approaches to providing them, but for one reason or another I'd rejected them as inadequate. What I opted for instead has proved a welcome addition, and I thought I'd pass it along to the masses.

I moseyed on down to the local hardware store and picked up a couple of pairs of plastic drawer pulls, along with some stainless #8 finishing screws and cup washers. I mounted them on the side luggage. I got one pair for the front of bags that was 3" on-center and a pair for the back that was 3 3/4" on-center. You could use 3" all around if you want.

Here's a couple of pictures to show you the layout. First, a shot of the front left bag looking down.

Next, here's a shot of the right rear. The nicest part of this arrangement is that I can use several hooks of varying kinds all at once. Large hooks, ball-ends, small hooks, etc.

Mounting on the inside is a snap. The flat-head finishing screws and the cup washers bite well into the side and provide great strength. Just measure (OK, twice..) and drill a couple of holes in the plastic, screw ëem up tight and yer off!

I have also found them convenient to strap on a spare helmet on the right-rear bag. It stays remarkably clean.

You may want to opt for metal pulls if you can find them. I have, subsequently, and keep them in reserve for some signs of failure of the originals. I've had 'em on almost two years now, and they're still as good as new. I like the flexibility of the plastic pulls because it lets me sneak the ball-end cord in easily, but still keeps it fairly snug. YMMV.

Cheap, easy, and eminently useable.

See you at Daytona!

Cary Stotland
Austin Road Warrior
'85 K100RT
Kaw Z1
Carpe Beemum! Seize the Beemer! (just not mine, OK? ;-)

K-Knee pads

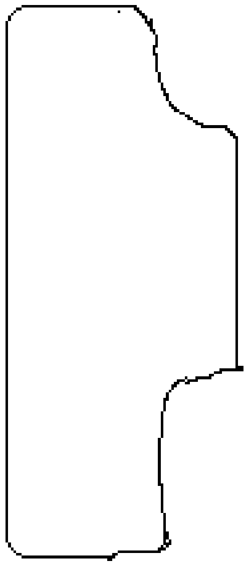
By: Niel Manson

A K-LT is a wonderful thing but sometimes proportions are a little odd. Take, for instance, the place where your knees go. BMW graciously shielded us from unwanted heat with a very hard plastic/rubber knee pad which has no give. I found that after a very short ride my knees and right ankle were very uncomfortable. As a side issue, the pocket was deep enough that my knees felt trapped when stopping. I rectified the situation without too much damage to the integrity of the bikes appearance.

First I started off with a closed cell foam pad made of recycled plastic and sold at (shudder) WAL-MART in the camping section as a sleeping pad. Cost, less than $10.

A detour to the fabric section produced about 1/3 of a yard of heavy cordura nylon in a tasteful black and about 30 inches of velcro with adhesive. Some heavy duty contact cement from the hardware section and I was in business.

I first cut the foam to the required shapes. For my purposes the height came out to be 15 inches and the width is about 5 inches. This sketch is of the left side pad. The right is almost a mirror image. I suggest cutting the pad large to start with and then trimming to your needs.



After you are satisfied with the shape of the pads, lay them on the cordura and trim the cordura so that it has about 1 _ inches of overlap all around. Make "V" cuts at all curves. Coat the exposed side, the edges, and about 1 inch of the back of the pad with the contact cement. Coat the back of the cordura with the contact cement. Stick them together, apply pressure, allow the cement to cure and PRESTO.

I mounted the pads to the bike by applying adhesive velcro to the inside of each pad, at the edge closest to the gas tank, hook side of tape on the pad. That way the pad can be removed if necessary and not completely ruin the looks of the bike. This padding keeps the knees from being rubbed raw on all day rides and also helps to hold them out of the "knee well" that the LT is famous for.

Hope that this is helpful to those of you with long legs. Peace

Sigma Speedometer Calibration

By Lance Haysom
November 2001

Phil Billingsley is quite correct with his doubts as to the accuracy of setting up his Sigma computer. I had the same difficulty and concerns with mine.

The first thing to consider is that the circumference changes with load and speed. In fact, the greatest error will be obtained when the bike is furthest away from its real life use situation, namely, being pushed forward, at a lean, without a rider on top. These unfortunately are probably the exact same conditions used to set the computer up in the first place.

I improved on this accuracy by riding it over 10 revolutions. OK. It does need a big tape measure but it improves the accuracy no end.

To increase accuracy further I needed an accurate mile (or more). I found out that my local council has a 'measured' mile that they use for testing taxi meters. I don't know but I also assume that other uses could include calibrating police speedometers, etc.

This 'measured' mile was simply a local public road with some markings on it a mile apart. Unless you knew what they were for you'd never give them a second glance.

What you have to do is to ride over the whole mile at your typical speed and load. You should be at your typical speed when you enter and exit the mile. I'd also suggest having a half tank of fuel on board as well.

Note exactly how far your computer said this mile was. If you messed up, don't worry. Just do it again. Each time you do it just note down what the results were as all your doing is increasing the accuracy with each measurement.

The next step is just plain old maths...

We know the mile is a mile. Lets say your computer said it was 1.08. Not a big difference? Sorry, that's 8% of error!

To correct this error do the following;

The new figure = old figure divided by your computer's mileage claim

Example;

Your current figure = 1155
You did 4 runs with your computer saying
1 mile = 1.03 miles
1 mile = 1.03 miles
1 mile = 1.04 mile
1 mile = 1.03 mile
Average = (1.03 + 1.03 + 1.03 + 1.04) / 4 = 1.0325 mile

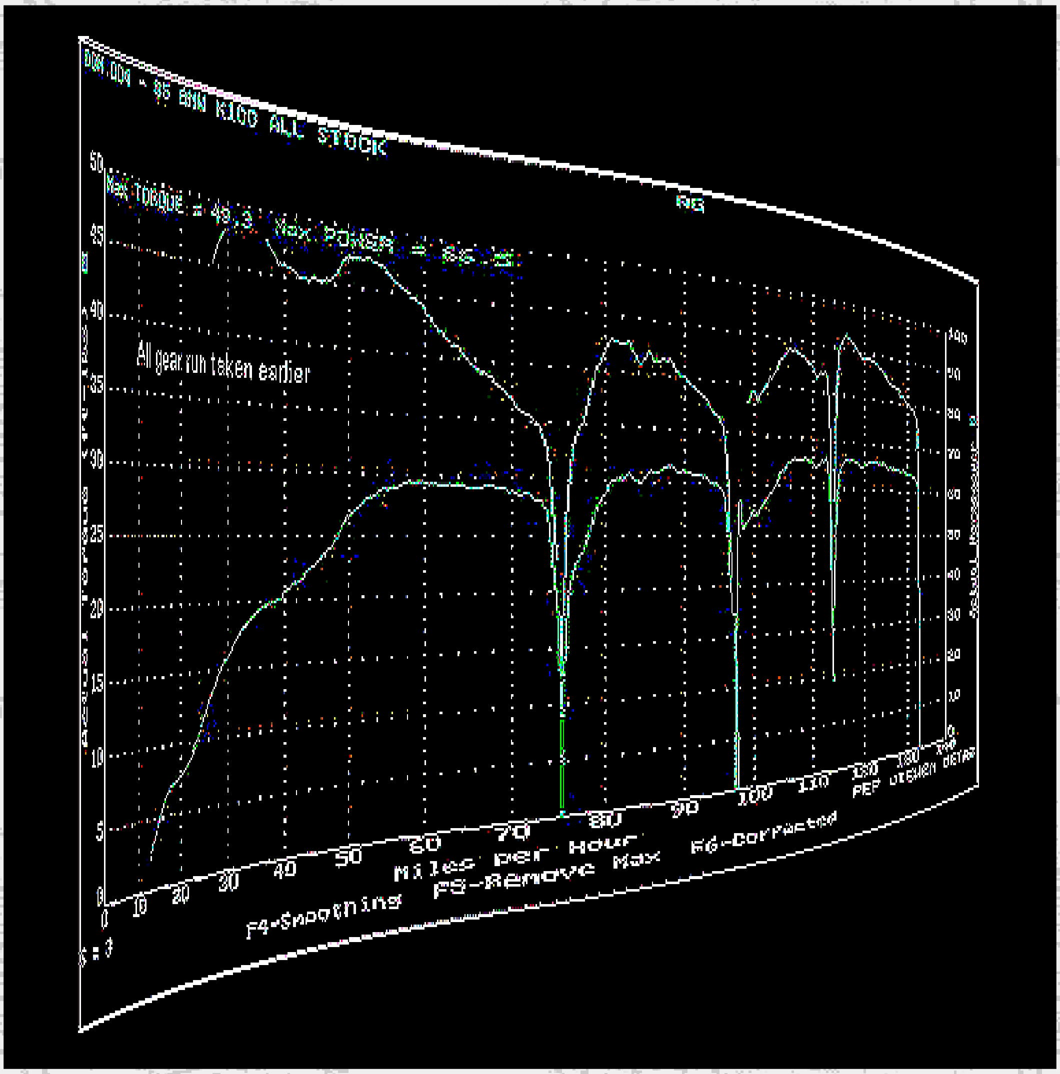
New figure = 1155 / 1.0325 = 1118

{Note; if we had not done 4 runs we'd have used 1.03 as the mileage which would have resulted in a figure of 1121}

The same principle can be used on bigger distance using GPS to make sure you get the mileage right. The only thing to remember is that it'll need to be in a straight line (or very close too). I reckon with 10 miles on the flat, the accuracy you would get by this method would be as close as the unit will allow, what with it having only whole number inputs.

Disclaimer; when riding or driving any vehicle, it's always a good idea to LOOK WHERE YOU ARE GOING! You do NOT need to stare at the computer while you are doing this procedure. A glance at the beginning and end is quite sufficient. Remember, bumping into things on a motorcycle is quite likely to hurt and make you look dumb.

The Great Dyno Test - in which certain parameters are changed on a 1985 K100RT



All Gears Run

Motivation: The motivations for this series of dyno runs were several: first was to provide an interesting club tech session; second was to really get some actual numbers testing the validity of techniques that have been suggested to improve K bike performance.

Caveats: *Lots of them:* dyno runs are not a 'precise science' - I doubt if DynoJet, the manufacturer of the dyno we used (a new DynoJet Model 150) would claim a "run to run, day to day" accuracy of better than 5%. There are many variables effecting absolute accuracy in the relatively uncontrolled environment that this sort of dyno is used in. Humidity, air temperature, weight of the tester, tire temperature (which changes as the runs are done), tire diameter (which also will change with tire temperature) all can effect the absolute values obtained.

In an attempt to control these variables, each run done was followed by a calibration run - where the normal operating settings of the bike were used. If this calibration run agreed with what came to be called our "Stock Run", the stock run was used as the standard against which the new run was tested. If it didn't agree with our "Stock Run"; - we used the best match of 3 (where two runs closely matched) or new calibration runs (as in the section on engine timing).

Conditions and 'stock settings': Our test conditions were approximately 50 degrees Fahrenheit and approximately 30% humidity. The air temperature did change before doing the Engine Timing runs, so we used a new calibration run for this series of tests.

The settings used for the standard (calibration) runs are **not** BMW standard settings. The timing on this bike was set to 30 degrees BTDC. Standard (factory setting) is 24 degrees BTDC.

Controls: We only had one bike to work on the evening in question. This bike had 44,444 (exactly!) miles on it when it arrived on the dyno. It is running stock plugs with about 15 k miles on them (had a new set, but did not have time to change them - mebbe next time), using the stock filter with ~15 k miles on it (but we did tests of the filter vs. other and none).

All runs were performed by the shop owner due to insurance regulations, and because he knows how to do them. This does not constitute a classic 'double-blind' test - but it was the best we could do and should remove my personal bias from the results.

Run parameters and methodology: The variables being changed were selected specifically to determine numbers for each variable. We purposely did not combine changes, since interactions between them with a fuel-injected bike are unlikely and we were limited in the time we had to do all the runs. In each case we attempted to make a change and then observe the results. If the results after a change appeared better, we would continue this change until the results stopped improving, or continued change resulted in worse results.

The specific parameters we were testing were:

- **Intake breathing** - specifically - air filters. It has been claimed by K&N Filters that their filter provides additional power. This may be the case in a carbureted engine, or with an engine that has a restrictive factory filter. We wanted to find out if this is the case in a K bike with fuel-injection.
- **Engine Timing** - it is considered 'general knowledge' that BMW tunes their engines for 'worst case' conditions, ie - an owner who may put not optimal fuel in the tank (by choice or by necessity). In the case of BMW cars, there are several chip makers who modify the factory timing maps to advance the timing with proven results of more power. The downside of advancing the ignition is that it typically **mandates** the use of premium fuel. The 1985 K100 engine, as specified by BMW requires premium fuel. Our tests in this case were to determine the optimal timing for the bike with the least advanced timing over the factory spec.
- **Mixture** - it is 'common wisdom' that the BMW K100 L-Jetronic system tends to go towards a rich mixture as the bike ages. It has not been clear if this condition is caused by time aging of the Air-Flow-Meter, or milage induced wear on the injectors.

We wanted to test the bike as it comes from the factory (with 44 k on it, and 13 years of aging), and then induce a leaner mixture and observe the power. This would give us a quick indication with this particular bike if it had aged towards a rich condition. To lean out the mixture - we used the high-altitude plug - which results in a ~10% leaner condition.

An interesting mixture test we did not do was to run the engine with a richer mixture. Thanks to an Email I got, this actually is fairly trivial to try - pressing the starter button while the engine is running will result in a ~10% enrichment of the mixture.

To further qualify the results - the actual mixture was measured with a gas analyzer, and the readings follow the mixture plot.

Conclusions: I'll add my personal conclusions after I discuss each run and the results of the runs. ***These are MY conclusions and not to be taken as gospel.*** I've provided the graphs so you can draw your OWN conclusions.

The Great Dyno Runs Part Deux

By: Don Eilenberger
March 1999

This is the second dyno run report run on my 1985 K100RT (the FINEST year!)

Thanks to Jeff DeCarlo for the loan of his Luftmeister sport exhaust system, and for the sound level measurements.
Thanks to Sun Cycle of Manasquan NJ for the use of their dyno.
Thanks to Brian Curry for the loan of a spare L-Jetronic brain.

Calibration Runs

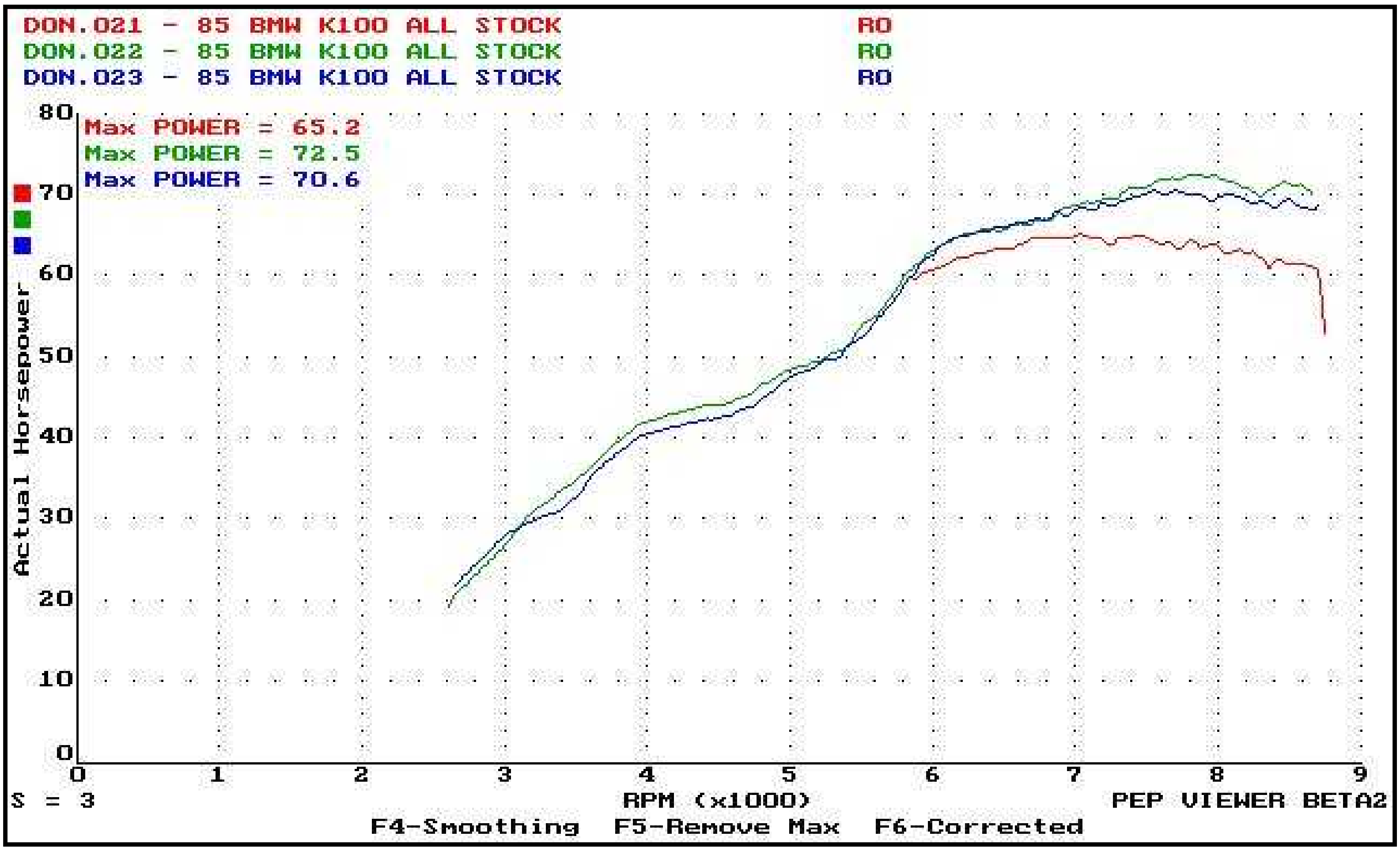


Chart 1: There are three horsepower runs illustrated in the chart above. Some explanation:

1. The run plotted in **red** (#21) was a base run. No changes or modifications to the engine/bike.
2. The run plotted in **green** (#22)was done with the starter button held in. Holding the starter button in on an L-Jetronic bike results in enriching the mixture by approximately 10% as it activates the start-enrichment circuit. The L-Jetronic brain prevents the starter motor from operating since it knows the engine is already running.
3. The run plotted in **blue** (#23) was done with a different L-Jetronic brain in place (Thanks to Brian Curry). The additional power may also have been a result of a full warmup of the engine at this point (the cooling fan was now cycling). This brain remained in place for the remainder of the runs.

Exhaust comparison:

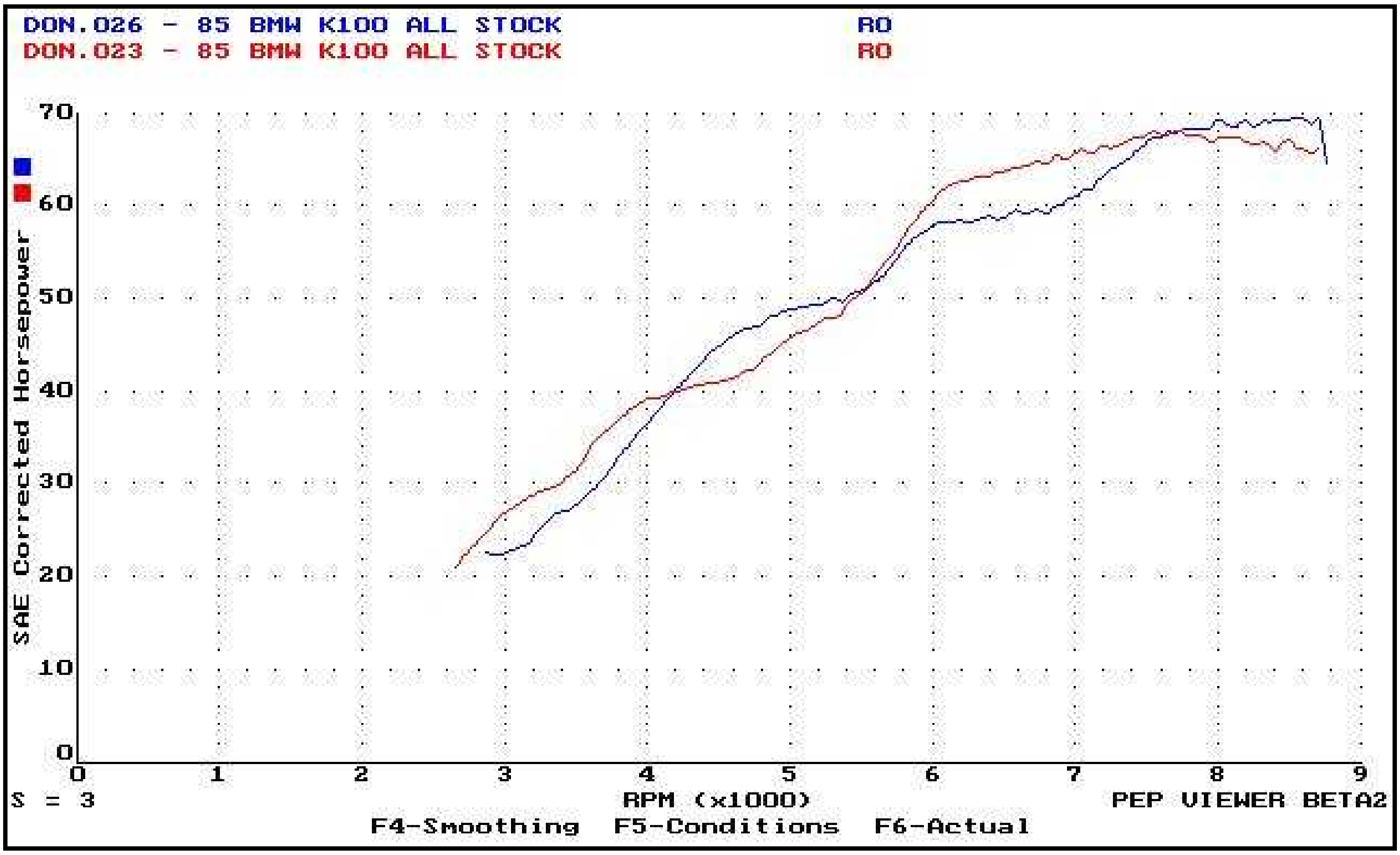


Chart 2: **Stock System** (run 23) vs **Luftmeister** (run 26) - **Horsepower plot**.

This chart should be self-explanatory. Over a wide range of RPM the Luftmeister exhaust resulted in less HP. It did produce a small increase in horsepower from 4,200 to 5,500 RPM and above 7,500 RPM, but the loss of HP at other RPM exceeds the gains for a net loss of power.

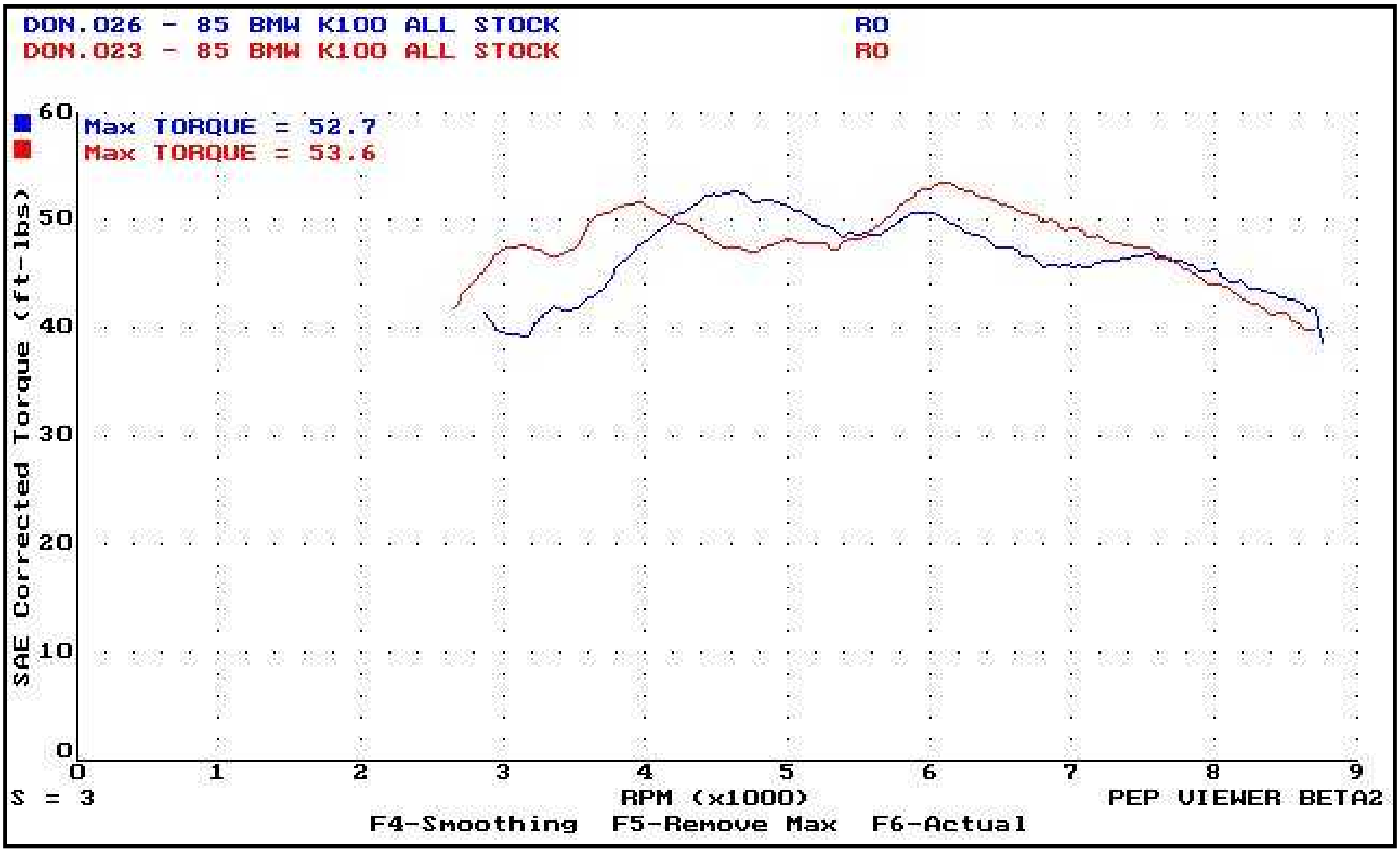


Chart 3: **Stock System** (run 23) vs **Luftmeister** (run 26) - **Torque plot**.

Once again - self-explanatory. Little gain by the Lufty over a very narrow RPM range.

K-Bike Electric Windshield Tech

By: Anton Largiader
August 1998

My notes on installing the electric windshield for the K-RT/LT. Although good instructions are provided, here are some observations for anyone interested in this product.

The upper fairing support bracket is different; this is required because the width of the mechanism will not fit between the original bracket and the fairing. The difference is very small but it's absolutely significant. It might be possible to modify an old-style bracket to allow this windshield to be used, and newer models probably have the updated bracket even if they have a fixed windshield. The visible difference is that there is a threaded boss for the relay to mount (on the left side) and the upper mounting ears are relieved to allow the mechanism to fit between the bracket and the fairing upper. The bottom line is that the fairing needs to come off if you do not have the correct bracket, although we did not remove the mirrors and the lowers as called for in the instructions. The instrument pod mounting changes, to move the pod rearwards about 1/4". This involves a spacer plate and a counterweight, which replaces the rear cover of the existing pod mount. There is less room for cables to run between the pod and the dash pad; in fact you will probably find that the pod rubs against the pad.

The power is fed from the "additional equipment" plug in the relay box. The wiring harness for the shield plugs right in and provides a new plug on a pigtail so that other equipment can still be attached. Power comes in from three different circuits: one feeds the controls, one powers the map light, and the the last (fuse 5, the "additional equipment" fuse) provides power to the actual motor. You may need to add this fuse or the windshield won't work! DAMHIK. On my bike, the pin to feed the map light was in the wrong position, so I added a jumper on the new "additional equipment" plug to divert power back into the correct wire on the electric windshield harness.

Installation time was about three hours, but if you already have the updated bracket the time will be much less. The complete kit included:

- Wiring harness and switch
- Upper fairing support bracket
- Revised inner fairing liner (and speaker mounting rings)
- Mounting screws (six for the liner, eight for the windshield base, one for the relay, possibly others)
- Replacement blind nuts for mounting to the fairing (different type)
- Activation mechanism (heavy, mounted on fiberglass base)
- Clear windshield panel and mounting hardware
- Counterweight, bolts and spacers for relocating instrument pod.

Take-off parts (old) will be:

- Upper fairing support bracket
- Inner fairing liner
- Rear cover for instrument pod
- Instrument pod mounting bolts (I think)
- Crossbar (under old windshield)
- Old windshield and mounting hardware

Staying Cool on a K-bike

By Don Eilenberger
September 1998

OK.. you will NEVER be "cool" on a K-RT or K-LT except in the middle of the winter.. it just ain't gonna happen, but you can make it so you won't pass out (comfortable) while riding (I did come VERY close more than once, and was ready to sell the bike after the ride down to Fontana last year - high 80's low 90's and humid.)

Things to do:

K-Heat-Guards. Made for the K100RT/LT. Don't know about other models. At the time I ordered mine - only the K100RT/LT ones were available. There may be other K models available now.

The K-Heat-Guards are molded plastic inserts that close the space between the fairing knee-pads, the bottom of the tank and the angled frame tube towards the rear. They force the heat from the engine rearward.

What's good about them: They fit fairly well as they came, but I (natch) made a few small mods to them. They do what they claim to.

MODS
The left one is held on by the four screws that hold the ignition coil cover on (which is different on the K75RT). It has a hole in it for your accessory plug, and another one could easily be added. Made no mods to the left one.

The right one is held on by two screws into an L bracket that takes the place of your alternator cover. It also has a recessed part that fits right where the lower cover screw goes - but it isn't drilled. The instructions are to leave the screw out.. but:

Mod 1 - I replaced the lower cover screw, and made a hole in the recess big enough to go over the head of the allen screw. Helps to position the bottom of the heat-guard.

Mod 2 - there is a tab with a hole in it that goes behind the upper forward mount for the bikes side cover. On mine - it tended to pull the side cover out of the mount (the mount is just a big grommet).. I used a fine bladed hacksaw and removed the tab..

Mod 3 - I worried a bit about air-supply to the alternator. The stock alternator cover has some slots in it - in the area where the fan on the front of the alternator could draw air into the alternator. I added a slot - about 1/2" x 2" in the same area in the K-Guard. I do have the ability to very accurately monitor my battery/charging voltage (digital voltmeter built into the bike.. something for another FAQ).. and the charging voltage (which would be effected by temperature - higher temps = less volts) has not been effected. When the bike is cold, the alternator puts out 13.7 V max (spec) and when it's warmed up - it's putting out 13.56 V - which is fine.

My ratings

OK - possible downside? The K-Heat-Guards DO push a lot of heat out around the battery. This could effect the lifetime of the battery since they don't like heat. I have check a check on the fluid level and have not had to top it up.. this after several longish VERY hot rides (on one - which Barry Blank was on with me - it hit 96F on the NJ Turnpike near Trenton NJ - on the way back from Square Root).

The upside - I survived the ride! And have not gotten sick from the heat this year (did once last year!)

Frank Glasmer (who is in Mississippi) reports that his K75RT runs cooler (guess they may make K-Guards for the K75RT!) if he takes the right side heat-guard off. His side cover is cooler. My side covers DO get quite hot - but with the Russell seat - I rarely come in contact with them - and if I do - it's through my Stitch. Hasn't been a problem so far.

Where to get the K-Heat-Guards (FAQ stuff!): They are made by a mom/pop sorta business. Husky Mountain, PO Box 593, Kingston, TN. 37763. Phone number: (865) 376-4968. Tell'm HI for me! Cost was about $75/pair. Took several weeks to get them, but they may have them 'stocked' now. Also a website at http://hometown.aol.com/bmwkguard/

Other stuff you could/can do:

Windshields - there is a later model BMW windshield with 'winglets'.. this helps a LOT with a Stitch - if you put the winglets in what looks like a backwards position (big side facing forwards). Pushes LOTS of air right at you - and if you unzip the Stitch a bit - right into the Stitch. I had to tighten the pivot screws on the hinges a bit on one side so it would stay in this position. Works great. Cost - zilch!

Make CERTAIN that the sealing gaskets around your fork legs have been removed and replaced with air-scoops. BMW parts - a retrofit for the heat and also to help cool the fuel tank. Cheap too.. the scoops are only about $4/each.

Baker WindWings - these are winglets that mount to a bracket and are mounted to your fairing somewhere around knee level. I haven't tried them - but may if I see some for sale someplace. I have heard reports that these also help a lot.

Where to get Baker WindWings - I think Tucker-Rocky stocks them so most any moto dealer should be able to order them for you. They do have (I checked once) a model specifically listed for the K-RT/LT. Seem to remember cost around $50/pair.

Finally - I've also found that moving my hands out towards the barend-weights, and having my Stitch sleeve openings more or less max-open, directs air right up my arms and inflates the Stitch! (Must look like the Michelin man!) VERY nice! Also no cost. Would be nice to have some way of directing air at the hands and sleeves when you want it (the K-RT wind protection is sometimes TOO good!)

Beat the Heat! or, how to cool down your K-Bike

By: Cary Stotland
September 1998

Hi, Y'All!

Got a hot K-Bike? Here's a cool tip to keep those summer days in line.

I *finally* got me an '85 K100RT back the end of April. I have Don Feferman from Corpus Christi to thank for deciding to sell it for a measly $3500, 16K miles, unmolested side bags, BMW tank bag, full-fairing bra, updated stereo (JVC) w/DIN connector for a helmet connection, and just a scratch or two! A true gem. OK, maybe I'm biased. He tossed in both a Clymer and a Haynes manual complete with maintenance entries. I was in love.

I picked the bike up in San Antonio from Alamo BMW who brokered the deal, drove home to Austin, spent two days checking it out thoroughly, then packed it up and me and a buddy drove straight out to Las Vegas! Did a 3000 mile round trip, two days there, stayed for four, then two days back. It was nothing short of way-cool. My friend has an '85 K100RS, and I'd been riding with him for a couple of years. I had a 1975 Kawasaki Z-1 that I had bought new, and even after 23 years and about 75K miles (It'd gone through 4 speedometers for one reason or another) I'd still hop on it and do 1000+ mile cruises with Eric (my Beemer lovin' friend). Only thing was that I didn't know what I was missing until riding with him, me having to stop every 90-100 miles for gas, tweaking the chain every 500 or so, can of chain lube in my hand, etc., whilst he'd be grinnin' at me in between his every-200-mile-or-so gas stops. It got depressing. So I sold the Kaw. Almost cried, but took the $1250 I got for it and shopped the I-net 'till I found Don's Beemer. Took me four days. Checked it out, fell in love, and the rest is now history. Except for the payments, that is! ;-)

But being here in Texas, it didn't take too awful long once getting back from Vegas for that K100 to commence to frying me. We've just had a rotten summer. Stinkin' hot. No place for a K-bike, right? I spent a great deal of time studying the problem, and after a couple of tries, came up with something that worked like magic. **Pipe insulation**. At Home Depot, (I don't own it, sell it, work there, et al ;-}) I got a couple of pieces of the GOOD stuff, **the smooth, soft, squishy kind**. One for 1+" diameter pipes (its about 3" in diameter) and one for 1/2" diameter pipes (about 1 1/2" diameter). They come both split with tape strips to wrap and seal or whole (uncut). The uncut versions are much cheaper, and work great. The foam itself is around a half-inch thick. Total cost for both 6' pieces is under $5. Get the insulation and a roll of 1" wide foam tape that's sticky on both sides. I'm not going to bug you with all the trial and error stuff, but the end result was marvelous. So here it is. I don't think it'll do any good for an RS, but you RT and LT guys listen up.

First target, the gas tank. If you look on the bottom of the tank, there should be some aluminum-coated foam insulation already in place. If not, check with your dealer to get a retrofit**. Take a good look at the fuel return line. That's the one that connects on the front corner of the tank. It runs right through the hot-air stream going past the radiator.** To help keep the gas cool, I slipped an 18" (ball-park. YMMV) piece of the 1/2" I.D. stuff over the fuel return line run from the tank back to the pressure regulator. In order to keep from tearing it and to get it properly aligned, I had to drain the coolant and remove the left side radiator hose. Well, time for a change anyway, right? You also have to pay close attention to keep the insulation from getting into the fan blades of the cooling fan.. Once it's correctly routed, put the radiator hose back on and it all stays in place. Be sure and spin the fan blade to make sure it's still clear. Believe it or not, this helps keep the gas tank much cooler. But there's more...

My main goal was to get the heat flow escaping from between the fairing and the engine under control. This seemed to be the biggest culprit in making my life miserable. With the tank back in place, by applying cut pieces of foam in judicious locations, I was able to accomplish this about 99.99%. The right side was the worst. It took several pieces, a couple around the air pick up tube and between the frame rail and tank, and a couple applied w/double-sided foam tape to the right fairing half itself. Also jammed a couple between the tank and the frame rails. ***I found that the correct approach was to try to guide as much of the airflow as possible through the vents on each side, and not let it out between the fairing and the engine.***

If you reach your hand into the rear-most vent, you can feel (or NOT feel) all of the open space behind the vent. I sealed this area on both sides by sticking a 8-10" piece of the 1" foam with the double-sided foam tape to the fairing pieces just behind the vent. Stick it on parallel to the rear-most vent and close enough to where it will squish up to the edge of the vent. Bottom line is spend some time studying the situation, do some trial-and-error fabrication, and dam up every crack you can find where there is the possibility of air flow coming through the engine/fairing junction.

For you guys/gals with the 29" inseams, click here...For those of you with RT/LTs & long legs (I consume 6'4" of vertical bandwidth), those fairings can be mighty tight fits. I've got a Corbin saddle which makes it even worse, since it's a bit lower than stock, and cradles me forward, putting my knees squarely into the knee pads on the fairing. I took some of the large left-over pipe insulation (remember, the soft, squishy kind) and cut out two foot long pieces, slit them lengthwise, and mounted them with more double-sided foam tape to the knee pads AS knee pads. I stuck them on rolled out (cut edges pointing downward, center hump pointing upward...looked a little better when done) I also feathered the edges as much as possible. See if you can make them out in the picture. (URL to follow) I made 'em long enough so that I could mount a single piece to contact my knee at the normal position (feet on front pegs) AND lower down for when I put my feet on the back pegs, a la a back-rest-chair position. What a great deal! Not only more comfort, but those knee pads get warm, and the extra insulation helps the knees stay cool. Letting me place some of my weight on my knees helps those 600+ mile days roll on by.

The only downside is that the foam is a major bitch to cut clean. I tried a sharp razor knife, but my edges are kind of ragged, so it isn't the prettiest. **Kudos to those who suggested electric and hot-blade knives.** I've been looking EVERYWHERE to try and find the same kind of foam in sheets, so it won't curl and my cut a little better. If/when I do I'll let you know. In the meantime, I'm willing to suffer looks for comfort any day (form over function? Nah, not me! ;-})

The end result..

You guys in the Stiches close your eyes! Now, I can wear shorts while riding while it's 100+ without frying my legs! The only caveat is...wear socks! There's still a bit of heat on the left side coming off the pipes. Also, depending on cross winds, the air flow out the vents themselves can wrap back around some and get a little toasty. But the improvement was dramatic, and well worth the few bucks to do it. **Now when I feel the heat, I can tuck my legs into the fairing and cool off.** Quite a change! It took a couple of tries to get all the pieces cut just right, but there's plenty of foam to work with. Once you get 'em right, it just takes a couple of seconds to jam 'em back in when you remove the tank and fairing pieces for maintenance. The engine itself stays remarkably cool.

On a REALLY hot day, the tank will still eventually get hot, but it takes a great deal longer. For then, I got some 2" wide black foam tape that's about 1/8" thick and sticky on one side. You can see it on the side of the tank.

I'm probably going to add another aluminum-backed layer to the bottom of the tank someday soon, since I've got a left-over roll I used on the air-ducts in the attic, if I ever find the sucker someday! ;-)

Increasing K-Bike Fuel Capacity

by Ed Milich
November 2001

Are you sick of only getting 100 miles out of your K100 gas tank before the yellow low fuel light comes on? If so, this may help. I machined an aluminum spacer that fits between the gas tank and the gas cap that allows you to fill the tank up almost all the way. This allows me to go ~135 miles before the yellow 7 liter warning light comes on. This effectively added ~20-30 miles to my range.

I've seen other spacers that perform the same function, but mine re-works the vent system so as to minimize the amount of overflow gas that spills out of the drain hose. Basically, the vent is jacked up higher in the gas tank so that the sloshing gas doesn't reach it as easily.

There are two vents that I re-routed. One is the overflow vent inside the gas tank that spills out gas if the tank is filled above a certain level. I never could understand what the purpose of this feature is. I capped this off underneath the tank with a machine screw and some Teflon tape. I used the vent on the surface of the gas cap recess on the tank for my new gas vent line. The spacer would ordinarily block this, so a new vent passage is drilled through the spacer. On the inner surface of the spacer, the vent should be angled up so that it's a little harder for liquid gasoline to escape. See the included photos for more details.

Specifications, aluminum spacer:

inner diameter:	3.64"
outer diameter:	4.58"
height:	1.02"

I made this spacer using a hole-cutter on a vertical milling machine, and the vent holes were cut on a drill press. The angled vent hole is a bit tricky to cut on a drill press- the tool wants to wander down the angled workpiece. Use a punch to start your hole, and take your time.

You will need to make a trip to the hardware store for four (4) significantly longer gas cap screws. Also, I chucked the stock rubber gasket that originally went between the tanks and gas cap. The rubber stuff was allowing gas to leak between the tank and spacer. I instead used some thin (0.050") gasket cork that I bought in a roll at Pep Boys. I cut my own gaskets to fit between gas cap and spacer, and also spacer and gas tank.

After you're done with the mod, fill up your bike and ride it 10-20 miles. Turn it off and quickly open the gas cap to make sure that the new vent is working correctly and that there's not tank vacuum (indicated by a sucking sound when you open the tank).

After all of this, my gas range is close to the 175 mile mark. Woo hoo! Now if I can just get that Tijuana doctor to perform the bladder enlargement surgery...

Disclaimer: gasoline is dangerous stuff. Don't half ass this mod or you might find yourself looking like a burnt piece of cinnamon toast. Perform this mod at your own risk.

Ed Milich
emilich@hotmail.com
DoD#DCLXVI

Fuel Cell Project

Parts List

The Bike with Fuel Cell Installed

The author assumes no responsibility for any of the ideas presented here. Since this is a private effort and not a business

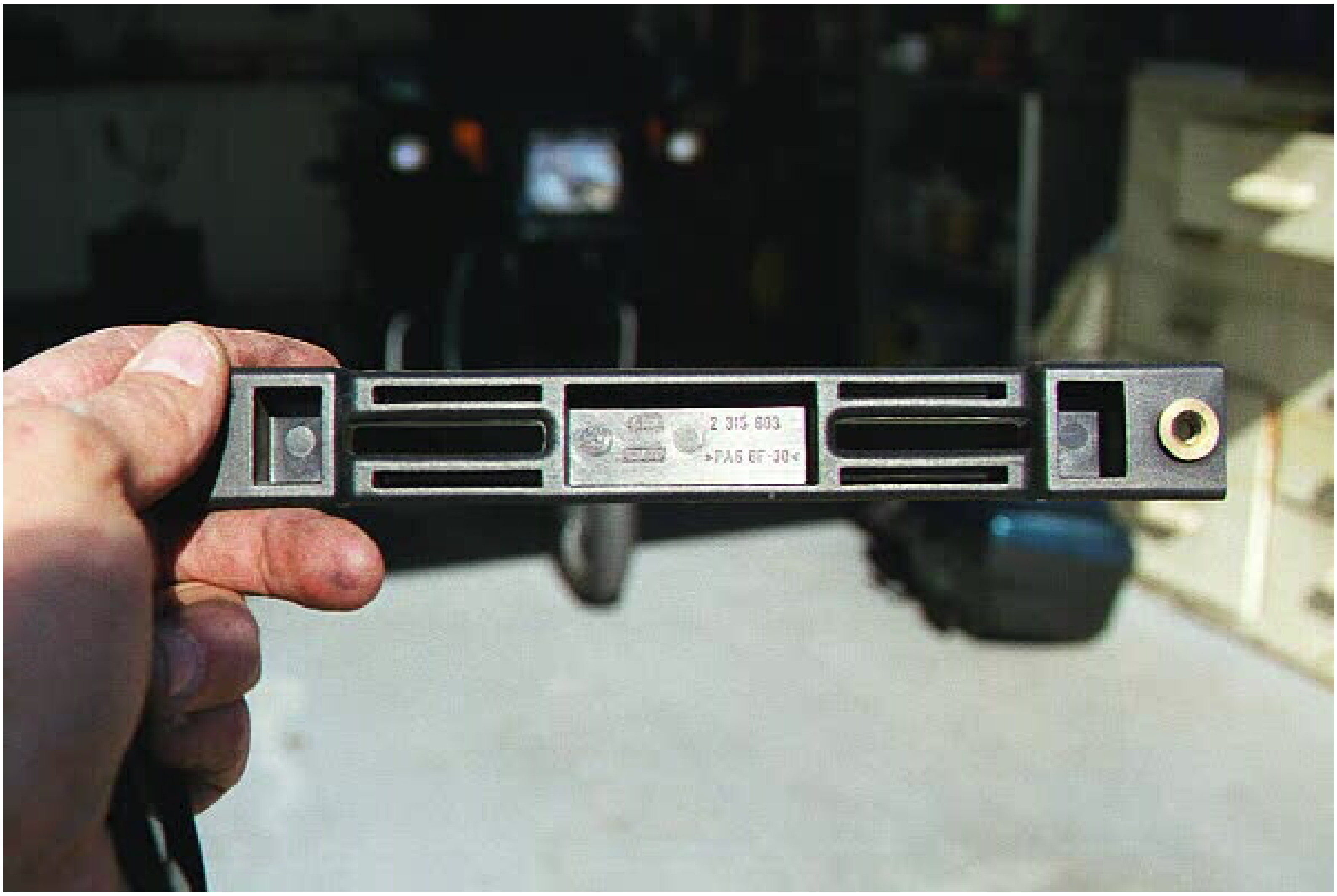
all ideas, component locations, and any other information provided here are provided as a complementary offering only.

Anyone using any of this information does so at the own risk and liability.

The rack with one cross brace removed for drilling

(Note white dots on the tail piece. These are 1/8" pilot holes drilled from the inside through the supports for

the original rack (22 litre trunk)



This is the cross member. See the circles in the square recesses. These get drilled out for the supports that come up from the tailpiece

Note the two silver vertical supports. These stabilize the rear rack and can stay in place if the cell and platform

are removed and the original trunk put in place.

This shot gives you an appreciation of all of the supports added. The two that hold the cell mounting plate attach in the

cross brace mounting bolt holes. You can see one rack to tailpiece suppor in the back.

Note the routing of the fuel line down to the fuel filter mounted behind the saddlebag rack.

The fuel line then passes through an existing opening into the under-seat compartment.

Note how the fuel line loops around to avoid kinking and then heads off to the shutoff valve (next picture)

The shutoff valve is clamped to the frame and the frame is protected from being scratched by the clamps.

From the valve, it heads off to a 5/16" "T" in the fuel injection return line.

The orange switch in the upper left is the fuel pump illuminated switch. It actuates a 30amp relay which operates the pump.

The switch is mounted in a BMW switch blank which was cut to hold the switch - a very clean install.

PARTS LIST

1. Fuel Cell - Fuel Safe CT105 - ~$150.00
2. Shut off valve 1, 3/4" long MILTON part number s1094-4 - Air compressor supply. All brass forged body with plated brass ball, teflon seals, 1/4" turn handle.
3. 1/4" NPT to 5/15" Male hose barb, LASCO part number 17-7715. (these go to the shutoff valve above) - Any good hardware store
4. AN-8 to AN-6 adaptor Earl's part number 989486 - Find a good hot rod shop, preferably one that is serious about racing. - $9.95
5. AN-6 to 5/16" barb 90 degree (slightly larger that 5/16" but will work). Earl's part number 709106. - Hot rod shop as above - $16.20
6. AN-8 cap part number FCM 3741 (don't know if this is Earl's or not). - Ditto on the location
7. Fuel pump NAPA part # 2P74019 - $29.99
8. Fuel filter NAPA part # 3032 - $3.99
9. Fuel hose clamps (12) NAPA part # 505-1204 - $5.88
10. Brass Tee NAPA Part # 730-2948 - $ 4.49
11. Cap (for covering the fuel filter inlet when the tank is removed NAPA part # 2-645 - $1.42
12. 10' fuel line (Fuel injection rated) - NAPA part # H-205 - $50 - You won't need this much but it's hard to say how much you will need.

Adding a Trek Bicycle Speedometer to your K100

By Robert Novielli
January 2001

I too have encountered the the "dysfunctional speedo" in my life with my 1987 BMW K100RS. At 51,200 miles, the speedo quit on me. Thanks to your superb pages, I was convinced that I knew the answer to the problem and proceeded to pull the speedo off for repair.

Imagine my surprise that when I opened up the case to the speedo, it was not only seriously corroded, but corroded to the point where two lightbulb sockets were completely rusted out, pins were corroded beyond any repair, and (tragically funny) a small shower of corrosion all but poured out of the speedo assembly!

With a big sigh, I called the BMW dealer near me to find out how much a new speedo would cost. $650. Uninstalled.

Now I don't know about you, but that is a huge hole to blow into my wallet. I needed a fix that would be cheap, easy to install, and would be accurate enough to hold me over until I can afford to buy the new unit. Some of you may already be scoffing at my answer.

I installed a digital Trek bicycle speedometer to my K100. In fact the whole assembly time to install the unit required less than 20 minutes. The Trek unit needed some modification to work. I ground the metal casing off of the small magnet and glued the magnet to the Rotor Carrier (front wheel) with one drop of Krazy Glue. I also ground off the plastic mounting bracket on the speedo sensor and taped it in place on the left front fork. The spacing between the magnet and the sensor needs to be around 1/8 inch, so the tape helped in positioning (I later used hot melt glue to hold it in place). I ran the speedo wire up the fork, used two plastic lock ties to keep the wire from flapping in the wind, and attached the Digital readout to the speedo face with a bit of sticky backed velcro.

No, this isn't a Bimmerphile quality repair at all. And no, it isn't without problems. At 80 mph (about 4600 rpm's in top gear), the speedo delivers false sensor readings: the magnet is rotating so fast that the sensor fails to pick up with every rotation. At any speed below 80, the speedo is dead accurate.

For a total outlay of $23, I now have a fully functioning digital speedometer on my BMW. The speedo delivers MPH, Time, average speed, max speed, trip odometer, and normal odometer as well as a clock. So far I have put just under 2000 miles onto the unit. It hasn't come loose, lost a beat, or ceased functioning in any way. The magnet has not affected wheel balance in any discernible way. Better still, this unit is waterproof. If you can't afford a whole new unit for you bike, this is a worthy option for a fix. At the very least, you will know how far you have traveled which sure beats guessing how much fuel is in your tank after 2 hours of riding.

Hope this helps someone else on a budget.

Robert

How I Switched From K75 "S" bars to "C" bars

As always, this is my experience and yours may differ.
Please use common sense and if you feel this is beyond your capabilities please bring it to a shop.

Preparation

Total time: 3 hours

Parts Needed:

K75 "C" bars (of course!), a bunch of 6" zip ties, red BMW#10 Lube, New Foam Grips (get the kind with the "lube 'n glue packet inside), a thick towel & Blue Loctite. (this piece does NOT deal with heated grips!) Optional: "S" Crash Pad Mounting Strips. Note that I later bought the European K100 Standard Heated Grip Kit (insist your dealer look, it is there :) It came in a big box with the a new (and a little wider?) "C" bar, grips and all wiring, switches, etc, and even bar-end weights. Think the K75 is smooth? Try it with bar-end weights :)

Things You May Need, But I Didn't:

New "C" Clutch Cable, Speedo connection, Choke Cable, Brake Fluid Line, switch wiring & New "C" Crash Pad (the "S" one nestles in nicely and will fit well with a little extension to the mounting bolts.)

Tools Needed:

Standard BMW "K" Tool Kit
Nippers or scissors (for cutting zip ties)
Knife (for cutting off old grips)
(I used the scissors & short blade on my Swiss Army Knife)
Simple Green & Abrasive Pad (for cleaning off left side bar end)

The Procedure

Prepare The Bike

Put the bike up on the center stand with plenty of room on each side of the bike.

Make sure the cover to your brake fluid reservoir is nice and tight.

Cover the gas tank and sides of the bike with a thick towel.

Prepare to Remove the Bar:

Crash Pad Removal:
Remove the rear cable cover (2 hex bolts) Remove the 2 bolts holding the crash pad and move out of the way.

Disconnect the clutch cable:
Make sure not to drop or lose the tiny pivot drum.
NOTE: I found the easy way was to pull in the clutch, then get a friend to hold the clutch arm (down at the transmission) while I slowly let it out. Then simply remove the cable from the clutch arm first, then from the handgrip assembly. After reading this, **Dave Brick** suggested using a screwdriver to hold the clutch arm.

Disconnect the choke cable:
First pop off the plastic cover, then remove the w-i-d-e slotted screw. Making sure not to lose the funky washer. The simply remove the cable end from the slotted housing.

Remove both side switch plates:
Remove the tiny phillips head screws at the bottom of the switch assembly. Move them out of the way (I just let them hang.)

Cut off the clutch-side grip:
Thoroughly scrub the bar to get all of the dried grip glue off (this makes it MUCH easier to remove and replace the grip assembly!)

> ***NOTE*: Ken Kochanski** (kkochans@ix.netcom.com) found that removing the zip-ties that hold the wiring & cables to the fore-frame at this point makes more sense then waiting to see if it is neccessary while positioning the new bars. Judging by the cost of zip-ties, I must agree. So,

Remove Wiring Zip Ties:
Carefully reposition the gas tank by pulling it up off of the mounts and back an inch or two so that you have access to the wiring zip-tied to the front of the frame. After making careful note of the location of the wiring and cables, *carefully* snip the zip-ties.

Remove the "S" Bar:

Remove the 4 hex bolts and mounts that hold the bars to the bike.

Remove the hex bolts on the bottom of the grip assemblies that hold the grip assemblies tight to the bars.

Carefully move the bar to the right and slide off the clutch grip assembly. If you did not clean well enough this could get tough.
Let the clutch grip assembly hang.

Move the bar back to the left and while holding the brake reservoir upright slide the speedo grip assembly off of the old "S" bars.

Install the "C" Bar:

Immediately slide the speedo grip assembly onto the new "C" bars and center the bars on the bike.

If yours is like mine, you will need to **barely** loosen the bolts holding the brake hose to the steering stem and to the speedo grip assemble to re-align the hose or the bar will not fit. If you loosen this bolt too much you

will have to bleed the brakes *(which might not be a bad idea...when was the last time you did this?)*
If you want you can drain the brake fluid and replace the Brake hose, you will then need to bleed the front brakes *(and why not the rear while you're at it?)*

Center the bars on the steering cradle, replace the mounts and replace the 4 hex bolts.
Do not tighten too much at this time, only enough to hold the bar in place while you hop on the bike and get it to a comfortable elevation.

Once you've got the bar where you want it, carefully center the bars and tighten those 4 bolts down! I used a little blue loctite just to make sure.

Replace the Bar Components:

Slide the clutch grip assembly onto the bars and position both assemblies on the bars so that when the clutch and brake handles are fully pulled in the ends just meet the end of the bars. *(Other may differ on this placement but examination of several new K bikes at Bob's convinced me this was proper.)*

Again sit on the bike and fiddle with the elevation of the brake and clutch handles until they feel right, then replace and tighten the tension bolts.

Replace the clutch and choke cables.

Re-lube the clutch assembly with #10 grease (can't hurt).

Reposition Wiring:

If you haven't already, carefully reposition the gas tank by pulling it back so that you have access to the wiring zip-tied to the front of the frame.

After making careful note of the location of the wiring and cables, *carefully* snip the zip ties holding the wires together and to the frame. Temporarily replace the switches and reposition the location of the wiring in order to get enough slack where the switch assemblies are not pulling on wiring throughout the entire arc of the Bar movement.

Replace the switch assemblies and re-check that there is slack in the wiring and cables throughout the entire arc of the handlebar movement.

Finish The Job:

Re-ziptie the cable connections and replace the gas tank.

Replace the cable-cover and then the crashpad. If you are using the original K75S crashpad without extensions, do NOT tighten the 2 bolts all the way, just enough so that it is snug.

Make sure everything is tight and works correctly **BEFORE** going out for a ride, then congratulate yourself because you are done.

!

Customizing your stock K1200LT seat

By Will Card
November 2001

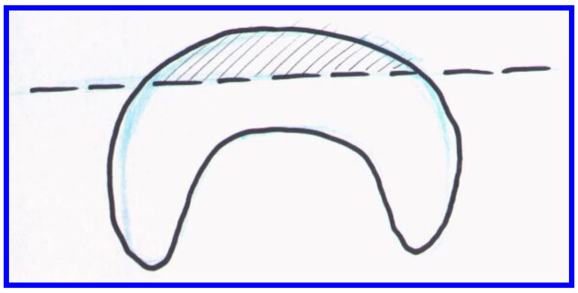
The following instructions were used successfully to remodel the stock seat on a 2001 BMW K1200LTS for greater rider comfort. ***This is <u>not</u> the heated version of the seat and I strongly recommend you not try modifying the heated seat.*** *Few people enjoy sitting on logs for long periods of time but that's what they get using a stock LT seat. The following instructions provide an alternative to expensive custom seats. However, use of these instructions implies no warranties nor guarantees. Proceed at your own risk.*

Please read through these instructions completely before starting work.

Armed with confidence after reading another rider's instructions on how he modified his stock seat, I took the plunge and modified my own 2001 BMW K1200LT.

Thought others might want to consider doing so as well so here are the details.

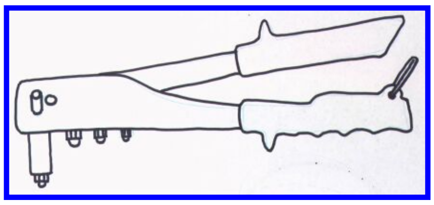
The objective is to trim the top of the seat's foam core from a rounded/concave log shape to a flatter one, like this (you're looking at the seat from the front).



Please excuse the hokey graphics but, hey, what do you expect from something that's hand-drawn!!! <wink>

List of Materials:

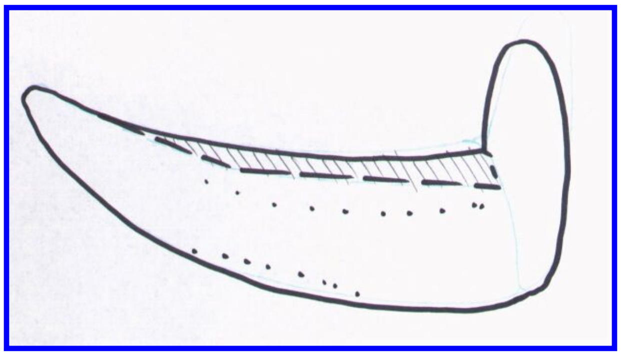
1. Rivet gun (the type with the "nose" sticking out rather than the flush one; see graphic below).



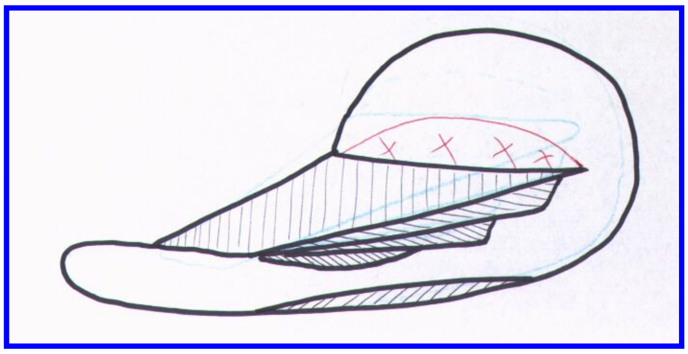
2. 1/8-inch (3mm) Rivets. I used Arrow E-Z Pull aluminum short rivets. Bought one large box of 50, I believe. Used about 30.
3. 1/8-inch Rivet Washers (or any washer that will fit). I used aluminum Arrow E-Z Pull Back-up Washers. Bought two boxes of about 30 each, as I recall. Used less than one box. I had some left over.
4. Contact cement. Any kind.
5. Long sharp knife, preferably an electric knife like you'd use to cut a turkey. Or you might use a heated knife but they're pricey (see http://www.demandproducts.com/hotknife.html.
6. Electric drill with a sharp 1/8-inch drill bit and sanding disk.
7. Chalk.
8. Awl or leather punch.

Process:

1. Board your Beemer and sit on the seat.
2. Mark with chalk on the seat the outline of your legs so you'll know where to trim the foam down a bit. That is, although your intent is to cut off the log-shaped "top" of the seat, you'll also want to trim off a little on the sides of the seat where your legs are so there's nothing pressing against the legs with the lower seat position. The chalk can be easily cleaned off of the seat, by the way.
3. Remove the seat from the bike by extracting the four silver Allen head bolts attaching the seat to the frame arm protruding from under the oddments box lid.
4. Turn the seat over so the bottom is facing up to protect the leather from abrasion.
5. Using the 1/8" drill bit and electric drill (duh!!), drill out all of the existing black rivets on the underside of the seat from the front around to the split in the leather about 2/3 of the way to the rear (about 15 rivets on each side). The heads of the rivets will typically get caught on the drill bit. The shaft of the rivets will be forced into the seat foam.
6. Now, keeping the bottom of the seat up, carefully pull the leather from the seat pan (the hard plastic base). It's adhered to the pan using contact cement but the leather will readily pull off if you pull on it carefully. The leather will tend to return to its original shape and re-stick to the pan so you'll need to do some "juggling" to get the leather off but it's easy to do.
7. Turn the seat back over (so the bottom is facing down) and peel the leather back from the foam and lay it over the back-rest portion so it's out of the way. You can stretch it a little but be careful not to do so too much.
8. At this point you'll be able to see most of the old rivet shafts imbedded in the foam. Just press the foam downwards toward the seat pan and the rivet shaft will pop up so you can grab it. In a few cases, you might need to dig a little. A pair of needle-nose pliers helps.
9. By laying the leather seat cover back over the foam, you'll be able to see where you marked it with chalk for your legs. Flip the seat cover back over the back-rest. Using the sanding disk installed in the drill and holding the drill at right angles to the seat (sideways), sand off about a quarter inch of the seat pan across the areas on both sides where your legs will go.
10. Trim up the area you sanded to remove burrs and melted plastic (the sanding will melt the plastic seat pan). You might just be able to break off the excess/melted plastic but **be sure to wait till it's cooled**!



11. With the seat cover pulled back over the back-rest and the seat placed flat on the ground, top-up, you are ready to perform surgery. Using the electric knife (or whatever you're going to work with), carefully cut away the foam from about four inches back from the front tip of the seat to a point roughly vertical with the back-rest. (Side note: I actually cut mine back underneath the back-rest till I could see the "spring" cross-ties that support the seat pan but you need not go that far. In fact, it's probably better that you don't.) I used an electric knife with about an eight-inch blade. Thus, because of the width of the saddle, I had to make two parallel horizontal cuts - one on the right half of the seat and the other on the left.

    Be sure to cut with a downward angle, as shown above. If you don't, you won't be able to take off enough to make much difference and you won't leave an open area for your tail bone, which is crucial for comfortable long-distance riding.

12. Notice the dotted lines in the graphic to the left above and the side wedges in the graphic to the right above. They represent the additional cuts that you'll need to make to round off the sides of the seat after your horizontal cuts. This will allow space for your legs. The cut-away area on the bottom of the right-hand graphic represents where you sanded off the edge of the seat pan. You'll want to cut away a small amount of foam there as well.
13. When all the cuts have been made, you'll want to invest a little time trying to even out flat areas and round the edges. The leather seat cover is very thin so it shows bumps and ridges. When I reassembled my seat, I was chagrined at how...um...home-made I thought it looked yet everyone I've shown it to felt it looked fine and didn't notice the bumpiness that I did. The individual who remodeled his seat and from whom I drew my inspiration used a disk sander to smooth the foam. Not having one, I tried the drill-based disk sander (used above to reduce the seat pan edges) but it didn't work well. I ended up doing all my fine-tuning using the electric knife.
14. Once the foam is as good as you can get it, pull the leather seat cover back down into position over the foam, flip the seat over so it's right-side-up, and pull the cover tight over the foam. See if you need to do any more fine-tuning. If not, flip the seat over so it is bottom-up once again.
15. Starting on one side and then alternating from one side to the other, using either an awl or a leather punch, stretch the leather tight over the foam equally on both sides (you should see about the same amount of excess leather on both sides under the seat), hold the one side in position and then locate the existing rivet hole in the seat pan edge and punch a hole through the leather cover for the new rivet. (The pre-existing rivet holes will be too far to the inside after cutting the foam to be able to re-use them.) With the hole punched, using the rivet gun, install a rivet in the new hole through the leather and the seat pan. Be sure to get it through both the leather skin and the plastic seat pan! I found it made things simpler if I just left the awl in the hole so it kept the skin in place till I had the rivet gun poised over the hole. Then I'd remove the awl - while keeping the skin stretched taught so the new hole remained over the existing hole in the seat pan - and insert the rivet. Remember to insert the rivet washers along with the rivets for a secure connection.

    Here's the bottom view of the finished job. You can clearly see the old black rivets along the "top" and the new silver-colored rivets along the sides. The new ones begin to the right of the large white round label on the right upper portion of the seat pan. You can also see, in that same area, the seam in the seat cover that marks where I stopped drilling out the old rivets.

16. Once you've completed the riveting, you can use the contact cement to secure the areas of the leather skin that aren't held close to the seat pan. I found that I only needed it in the area where the seat cover separated (was stitched together) at the widest part of the seat.
17. You can now trim the excess leather (where the original rivet holes were) if you like. I didn't bother doing so since no one would see it and it didn't get in the way.

Here are photos showing how flat my finished seat now is. I placed the straight-edge on the seat in two positions (one slightly forward of the other) to demonstrate the flattened area of the previously-logged-shaped seat.

The following photo demonstrates the removal of a small amount of the edges of the seat pan where my legs go. I marked the general area with the straight-edge. Look just below the straight-edge and you can make out how the seat now indents slightly (just where the seat greets the Tupperware side cover and just above the seam in the Tupperware).

This completes the instructions on modifying the K1200LT stock seat. I just got through riding for about eight hours with about three stops where I dismounted the bike. Other than that, I was in the saddle the entire time. After about four to five hours, I had to shift about on the seat to keep my bum from hurting and I did stand up on the pegs occasionally, but that's just one heck of a lot better than the hour to two hours I had with the stock seat before the modification!!! Enjoy!

K1200RS Transmission Drain Plug Seal

By James Pellenbarg
April 1998

The problem is slow leakage from the transmission drain plug. There is no washer of any kind. The surfaces of the plug and the case are machined with small ridges that are supposed to fit together perfectly to provide a seal. Unfortunately, they didn't seal on my bike.

The dealer was ready to replace the transmission as they had no answers. Before to transplantation, I spent the time chasing after O-rings of various sizes to find one to fill the space between the bottom threads (on the case) and the base of the drain plug. I settled on a #14 O-ring (15/16" OD x 3/4" ID x 3/32").

This has proven over the last two months & over 600 miles to have corrected the problem. The bike was ridden on several occasions at speeds slow enough to cause the fans to operate. It was at these elevated temps that previous attempts would fail.

I believe that this information may be of value to anyone out there who may at some point experience similar problems with washerless drain plugs.

BMW K75RS Conversion

Like many other BMW riders, I became a fan of the K75 the first time I rode one. It is smooth, solid and as precise feeling as a Swiss watch. I knew from that first ride that one would end up in my garage sooner or later. It's still my favorite of the K-bikes, the power is adequate and the silky way it delivers that power is very satisfying.

So somewhere in the middle of the 1995 riding season a low-mileage 92' K75S found its way into the stable and my faithful R100RT was sold just before a five-week cross-country trip. The little K-Bike carried my wife and myself from Vermont down the Blue Ridge into North Carolina, across several states to the Durango National in Colorado, across the Mojave to the coast, back in to Angels Camp for the R.A. National, back out to the coast and around the Olympic Peninsula, through the north central states, around the northern shore of Lake Superior and home.

It never missed a beat. (In fact, in 64,000 miles the valves have never moved out of adjustment.) In the mountains of Colorado, it definitely struggled two-up with all our gear, but it kept on rolling. The altitude plug definitely helped at the higher elevations. (By the way, if you ride a Jetronic K-bike and haven't yet discovered the altitude plug in your toolkit, try it out the next time you're up high in the mountains.)

I love the bike but have never been thrilled with the fairing. I'm about six feet tall and most of that height starts above my waist, which puts my head up fairly high. In years of experimenting with various bikes, I've found that only two windshield heights will put me in quiet air (even with earplugs and a good Shoei or Arai helmet). The first height is low enough that the air stream begins at mid-chest or below, so that my head is above the turbulent airstream which has been stirred up by the windshield. The second height is about mid-faceshield level, I can see over the windshield edge but most of the wind is pushed over my helmet.

The standard K75S shield worked fine in hot weather but when more protection was needed, I ran into trouble. The "S" bars on my bike were replaced with "C" bars, which provide a nearly perfect riding position for me. The higher bars combined with my tall trunk, however, create a problem for most aftermarket windshields.

The nicely shaped Aeroflow was designed for use with standard bars. With the added head height created by the "C" bars, it was very turbulent. The Parabellum for the K75S worked better but the stock "S" fairing doesn't give the unit much to fasten onto. With the very tall (22") shield I needed, the base was overstressed and developed cracks. (Again, the Parabellum was designed for use with stock bars, with a 20" tall or shorter shield, it's fine.) Charlie Perenthian, who had forewarned me of problems with a very tall shield on that system, was very generous and repaired the base for free when it was sent to him for evaluation.

A new fairing, however, was definitely the best solution. The K-RT fairing and riding position are not right for me but the idea of a K75RS was very appealing. The K-RS fairing is much more substantial than the K-S fairing and mounts more solidly. With the K-RS structural design, the Parabellum system not only mounts solidly but actually reinforces the stock fairing; allowing a tall windshield to be mounted without introducing much flex. A call to Charlie confirmed that this combination would probably be able to support the taller shield.

If you currently own a K75 and are contemplating this project, you may want to first consider whether or not a used K11RS might be a

better idea. Even using mostly secondhand parts, this conversion can cost from two to three thousand dollars all told.

I strongly prefer the triple over the four but if you don't have that preference and you have a relatively recent K75, you could probably trade up to the K11 for the same cost as the conversion. The larger bike option gives much more power at the cost of, in my experience, more weight and vibration. It is also true, however, that the engine heat management on a K11RS is better than on a K75RS.

Pricing the brand new parts to do this conversion made my heart skip a beat or two, so I searched the ON Flea Market, the Internet and the usual used parts specialists to locate what I needed. It took several months and many phone calls to get everything together.

Special thanks go to Mark at Re-Psycle BMW and the staff at Berkshire Motor Works who helped locate some of the hard-to-find used parts. Darrell Faulkenberry and Marcus Poisson at Second Wind BMW in Milford, New Hampshire provided various helpful installation hints. Both of the dealerships mentioned have always gone out of their way to help their customers with special projects.

The K75 and K100 tanks differ in shape; the latter is narrower and taller. If a K75 tank is used with a K-RS fairing, the metal/plastic/rubber inner fairing needs to be cut to match the wider tank; this would take a very skilled hand and fabrication of a new edge molding to be get a stock-looking result. I opted instead to swap the K75 for the K100 tank. The internals of each tank are the same and mounting is straightforward although the K100 sidecovers also need to be fitted in place of the stock units.

The K-RS fairing itself mounts fairly easily as long as two people are working on the job at once. MOA member Steve Kanopka helped tremendously in that department. The main bracket (which should be bought new to ensure straightness) bolts right on. The lower brackets also mount directly into holes, which are already pre-threaded in the K75 engine.

The middle brackets must be fabricated but it's a fairly easy job to measure and make them. The instrument cluster bracket must also be notched and re-welded to make the cluster tilt at a slightly more acute angle to clear the inner fairing. The K-RS wiring harness gets connected to the K75 harness (they won't plug into each other) and that's it for modifications. The new fairing provides stock mounting positions for dual Fiamm horns, which provide a big improvement over the stock K75 unit. The K75S belly pan fits under the RS fairing without modifications.

The preload on the fork springs needs to be increased to compensate for the added front end weight so that the total sag is appropriate. I accomplished this using simple spacers and washers. Fork boots, designed for use on the /6 boxers, were added at the same time to help give the fork seals a long life. The Fox shock on the rear has always worked superbly and a K&N air filter has simplified maintenance while giving a slight boost to mid-range power. The Corbin Rumble Seat is very comfortable two-up, even on a very long day. The Top of the Line brand rack (800-782-4686) is well made, works perfectly and provides a good mounting plate for the K40 antenna I use (with a J&M JMCB-7000B citizens band unit) to keep in touch with the chase van while on tour. Baker-Built Air Wings remove much of the heat built up by the KRS lowers; I highly recommend them to all K-RS and K-RT owners who experience "K Bake".

The final product works very well. Essentially, it's very similar to a K100RS with less power but also less weight, less heat build-up, and much less vibration. The extra fairing weight does nothing to help the already top-heavy feeling all the K's have but the K75RS is less tippy than a K75RT. The larger tank does add 15 to 20 miles to the bike's range.

I've found reliability to be the most important quality of a lead bike used on organized tours and this bike is outstanding in that area.

In the summer, the stock RS shield provides plenty of cooling air to my upper torso and in the spring and fall the solid, quiet and effective Parabellum system adds the necessary extra protection. The net result of all the changes is a bike that I can ride day in and day out in perfect comfort.

Postscript 2/19/00: I did, with some regrets, sell my K75RS with 84,000 miles on it and still running strong. Now we'll see how the K1200LT does. For riders considering buying a K75, I still recommend it highly. Check the splines carefully and then go put 100,000 miles on the bike.

K-Bike Heat Fix

By: "Dr. Bob"

Many people with K-bikes find an uncomfortable amount of heat coming at them from under the tank. In the case of LT/RTs this is particularly troublesome because of the wind protection and particularly galling since the fairing contains obvious exhaust vents for this hot air. Unfortunately they are poorly designed, and they look neat, but are essentially nonfunctional.

The three steps described will reduce this problem to a minor annoyance, at a parts cost of about $150. They can be applied separately, but work better as a system. I have them on my K75RT. They can be used with/without a riding suit, which alleviates the problem all by itself for many.

1. K-guard heat shields reduce the amount of hot air coming at the rider. These are plastic sidecovers which fit below and behind the tank, replacing the small alternator and coil covers. On an LT/RT they fit up to the inside rear edge of the fairing. I think they improve the looks of the bike by cleaning up this area; mechanical purists may find even this small step toward covered mechanicals objectionable. The shields fit fairly well, but their function can be increased by sealing the edges with some kind of weather-stripping. I used half round pieces of pipe insulation. Note that some are concerned that keeping this heat in will fry the fuel injection computer. I'd rather the computer takes the heat than me. YMMV, especially if you have an 1100 instead of a 75. The air wings counter the problem to some extent.

2. Baker air wings screw to the fairing edge. They can be pivoted out to deflect air around the fairing at your legs, or pivoted in in cold weather to simply do nothing. It's very much like rolling the windows up or down. Drilling two holes is necessary on each side to screw the brackets in. Easy to install and use, and quite strong/secure enough for their purpose. They look a little funny, and come in clear or colors.

3. This step is simple and cheap. BMW rubber kneepads give a little insulation from the tank (which is also slightly cooled by the air wings) and space your knees out just enough to help the air wings circulate air inside your legs. They do tend to pick up an annoying white powder look if you are not incredibly careful about wax.

Your dealer should be able to help you find all of these products.

K-RT Foot Warmers

By Brian Curry
April 1998

Sometime back David Norton popped up with the statement that if you pulled the baffles out of the fairing lowers, you would be warmer riding in cooler temps. This made sense. Why had I not thought of it?

Someone else said that BMW made fairing bottom extensions that would keep the wind blast off your feet. This made sense and I thought I could make my own. Later Sam Lepore ordered a set and told me what they looked like. Very similar to what I made but they extended lower. (They also cost $65!!! Now compare that to the cost of making your own.) My next version will be larger that what is described here.

I tried this last year, (96/97) and by golly it works. In fact, when I forgot to put the baffles back in and take the extensions off, I thought I was going to die when it got warm, from toasted shins and roasted tootsies. I did not reinstall them this year until it got cool. The difference in warmth after installing them was very noticeable. WARMTH IS GOOD.

So how is this magic performed?

Fairing Bottom Extensions

For the fairing bottom extensions, I used a chunk of truck tire flap. I got it for free by asking at a local truck repair center.

At the bottom of the fairing, on each side, there is a 10 mm headed bolt with a big flat washer that supports the fairing bottom. I used this as a mounting point for the extensions on each side.

These are the original, tested dimensions and are approximate. Remember mine will be larger next time. The design was created by cutting a piece from a plastic file folder, holding it in place and seeing if it looked right, so feel free to create your own design.

All of these descriptions are viewed from the rear of the bike.

The left extension, using ASCII art, had this approximate shape:

```
         4 3/4"
_________________________
|                        |
|           O  (2 1/4")  |
|              (1" down) |
|                        |
|                        |   4 5/8"
|                      __|
|                     /
|                    |    Exhaust pipe recess
|                     \___
 \                       |
  \                      |
```

```
                       \_____________________|

                                2 1/4"
```

The top was 4 3/4" wide and the hole for the 10 mm headed bolt was 2 1/4" from the right side and 1" below the top edge. ("Eyeballed" location.) I cut a recess so the exhaust header pipes would not hit the fairing extension and make a real stink. (Pewwww!!) At the same time, I tried to keep it fairly close to the pipe to keep cooler air from getting to my foot. The top to bottom dimension last year was 4 5/8", but will be longer next year. I rounded the bottom left corner so the flat surface ended about 2 1/4" wide. (You can only do so much in ASCII art.)

The right extension, using ASCII art, had this approximate shape:

```
              3 1/2"
___  __________________________
1"   |                         |
___  |    O (7/8" from left)   |
     /      (5/8" down)        |
    /                          |
    /                          |   4 3/4"
   /                           |
  /                            |
  /                            |
  /                            |
  /                           /
  /                          /
  /_________________________/
  |   |<-- 3/4"

            3"
```

The top was 3 1/2" wide and the hole for the 10 mm headed bolt was 7/8" from the left side and 5/8" down from the top edge. ("Eyeballed" location.) The left edge sloped in towards the left to get close to the engine. It started sloping about 1" from the top edge. The bottom left corner was about 3/4" to the left of the top left corner. The top to bottom dimension last year was 4 3/4", but will be longer next year. I rounded the bottom right corner so the flat surface ended up being 3" wide. (You can only do so much in ASCII art.)

To do it on your own, first get a tire flap. (Used, and beat up is fine.) Or get some heavy rubber fabric about 1/4" thick. Get some heavy cardboard, or plastic sheet, and make some "trial" flaps. Then hold the cardboard, or plastic model on the tire flap and cut the final version out. I used tin shears to cut the tire flap. The flap is too thick for ordinary scissors. I drilled the hole through the flap into a block of wood. (Better than the table, bench, or your knee. ;)

Remove the mounting bolt and its associated large flat washer, put the bolt through the mounting hole with the washer on the outside, and install and tighten the bolt. (Don't ask the torque...) The washer spreads the load and keeps the head from pulling through the flap. The flap will curl a bit due to the shape of the fairing.

Go for a ride with warmer tootsies. :)

I was not able to observe any deflection of the flap at speeds up to about 60-70 mph. Even with runs to the ton, apparently it did not hit the exhaust pipes. (This may change with next years longer model. In which case, it will be "trimmed to fit."

Internal fairing baffle removal

On each side of the fairing remove the knee pad. They are mounted by two phillips head screws just below the pocket on each side and one phillips head screw at the very bottom of the internal panel. You can now see the fairing innards.

Some models had slots in the knee pads. This is where the warmish engine air will come out. If you do not have these the air will have to make its way between the knee pad and the engine, but in the winter any warm air is better.

On the left side you can see the baffle, a multi-planed plastic panel with a circular foam section on the right and bottom edges. It is held in place to the left fairing lower section by two phillips head screws. Remove them and the baffle can be taken out. I also removed the sheet metal nuts the screws thread into and stored them with the baffle until warmer weather. (They cannot vibrate off sometime during the winter. :()

You can see the right side baffle but no screws are visible from the inside. Its mounting is a bit trickier. It is mounted by two phillips head screws that go through the lower fairing panel rear exhaust air vane. (Look between the two vanes and you will see the screw heads near the inside edge of the rear vane.)

There are two different mounting style screws. One is easy to remove, the other is a bear.

The bear first. The phillips head screw is a fine thread machine screw with a 8 mm "sqooshed" lock nut. So to remove it, you need to reach in with one hand and hold a 8 mm wrench on the nut and with the other loosen the screw. It is a PITA but it can be done.

The easier mounting is uses a phillips head sheet metal screw and two of the sheet metal nuts. These take just one hand and a very short phillips head screwdriver. I replaced the bear setup, with the easy set up, on the bike that was a bear.

For those that want to do this, the parts for easy on and off are:

Screw:.............46 63 1 453 297
Sheet metal nut:...07 12 9 925 708

For those that are perverse, or to see if you were sent or bought what is a PITA here are those part numbers:

Machine Screw:.....07 11 9 928 488
Sqoosh Lock nut:...63 14 2 322 408

Once the mounting screws are removed it will come out in your hand. If you have the PITA setup, you will note the plastic is indented for the sheet metal nuts. I remounted the screws in the baffle, so I was only looking for two items in the spring and not six.

After removing the baffles I felt around with a ungloved hand and could feel more heat making its way to the rear and my shins.

This was done after "The Great Fall Trip". I wish I had done it before. But at least now I am warmer!!!

Take a ride and you will find it is warmer. Not necessarily a lot when it is cold, but every little BTU in the right place helps when it is freezing. :)

For those with LT's, you are somewhat on your own. The knee pads and fairing lowers are mounted differently. There is no large 10 mm headed bolt to mount the feet protectors on. Also, the internal fairing baffles are different. They are big foam bits. I have not checked out how to take them out. But if you can get them out, you too, can probably have more heat on you in the winter.

By Rob Lentini <roblentini@cox.net>
'87 K75S
Tucson, AZ
K Whiner MC#11

Try the following:

Front end:

- The fork tubes may be raised slightly in the upper and lower yokes giving you maybe about 1/4 - 3/8" lowering.
- A low profile tire such as size 100/90-18, available from Dunlop as the K591, will lower you another 1/4 - 3/8". I know, the stock Metzeler is also a 100/90-18, but the 591s are just lower.
- Shortening the internal fork spring spacers will also work. If you do this, just make sure the front end doesn't settle any more than 2 - 2 1/2" on its suspension from fully extended. Otherwise your forks will "bottom out".

Rear end:

- Again, a low profile tire will help, such as a 130/80-17, available from Dunlop as the K591. Net lowering: about 1/2".
- A 3/4" shorter shock is available from Progressive Suspension, Hesperia, CA.

Seat:

- You could convert your stock seat to the BMW "low seat" version or
- Have your stock seat's padding shaved thinner or
- Order a custom low seat from Corbin Saddles.

Summary:

- Lowering the front and rear end WILL negatively affect cornering clearance.
- You'll never notice it unless you are going fast in corners. If you can get close enough to the ground with seat mods, this is the best way to go - NO handling compromised.
- Maybe a reasonable combination of all the above may be the way to go for you.

Tip:

- You and the bike should take the Motorcycle Safety Foundation's "Experienced RiderCourse" (ERC). Will make you MUCH more confident! See MSF ads in all magazines for 800 number of course nearest you.

K Bike Performance Improvements

By Rob Lentini <roblentini@cox.net>

> Walt: Here's some K info I sent out a while back. If you'd like to include it on you www please feel free to do so. Rob

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Louis, Here are the major things I've done to my S over the years...

Engine-

- Ignition timing has been advanced, resulting in better throttle response and more low/midrange power. Send me your mailing address and I'll mail you an article I wrote that was published in BMWON.
- Fuel mixture has been very accurately set using an emissions analyzer. In addition to setting the air flow meter idle mixture adjustment to 2% CO, I have also recalibrated the air flap potentiometer to ensure the mixture is about 1% CO at cruise RPMs. Yours may be fine already. Assuming you don't have an analyzer, bring it to you BMW dealer and hook it up to theirs. Idle should be 2%, and full fast idle (start lever all the way CCW, about 4-5 K RPM) should drop to about 1%. Strangely, some Ks seem to be VERY lean which results in higher operating temperatures and less power. By the way, do the timing advance adjustment prior to setting fuel mixture. Note: adjusting the potentiometer is precision work requiring patience. If your bike is under warranty, you may void it. If still interested in "how to do", let me know.
- Valve adjustment is not critical, but can affect overall performance. You should shoot for intake clearances that are on the tight side of the spec, and exhaust on the loose side. Any time you adjust valves you will need to resynch the throttle butterfly bypass screws. I use a carb stix, an inexpensive mercury manometer.
- Use your favorite brand of oil at the proper viscosity and change it and the filter every 2500-3000 miles. DO NOT use ANY oil additives! I know, BMW filters are expensive, and the dealers will advise otherwise, but I use a Fram PH3614 filter available for $3 at auto discount stores. You choice. Keep the oil level between the sight window center dot and the upper mark.
- Install a K&N cotton gauze air filter to achieve more air flow and a noticeable power improvement.
- Replace the stock muffler with a Staintune slip-on muffler. It will improve your throttle response, looks great, and is lighter than stock. Quality is first-rate, and the sound has a slight attitude, though barely louder than stock. Staintune is available from California BMW-Triumph. I just saw a used one advertised on the net today.
- That about it for the engine--nothing radical at all, just basic "getting things optimum". By the way, don't expect any K to put out its full power potential until after 20,000 miles. They really are tightly clearanced, and the Nikasil cylinders won't smooth out until this much running.

Suspension and brakes:

- The K75S has a nice front end, but it can be improved. I think the stock fork springs are too stiff. I've replaced them with Progressive Suspension #1126 springs which are much more compliant to bumps. I use 5 wt fork oil, 280 ccs per leg, with 3-5% Dow Corning Gear Guard M added to the oil. This REALLY improves compliance and response to small bumps. Gear Guard M is a concentrated molybdenum additive, available from bearing supply stores in one quart bottles for about $20. Sounds expensive, but one quart will last you a LONG time. This stuff is highly recommended by Orlando "Oak" Okleshen, a leading BMW tech guru, for use in transmissions and final drives. I used to use Kal Gard Smooth Stroke fork oil with moly. Now I use Bel-Ray and mix in the additive myself, saving money.

- Replace the grabby front brake pads with SBS. They do less damage to the rotors, are very controllable, have good power, stop well in the wet, and the matching rear pads have lower friction for better controllability. If you have ABS the rear pad friction compound matters less, if at all.
- Rear suspension can be improved, likewise. The K75S shock works OK, but is nothing to write home about. There are two good options here. If you ride fast, and weigh 180 or more, Ohlins, Fox, White Power, and Progressive all make good aftermarket shocks. I currently have a Progressive "Adaptive" shock on my bike. It's a little stiffer than I'd like, but is smoothing out with the miles. Prior to this, I ran a BMW Nivomat shock for a long time, and it worked GREAT. I only changed over because I needed to be able to adjust ride height for two different wheel sets I use. The Nivomat is self adjusting for ride height and damping. I think you really might like one. They may be found used in BMWON flea market. Even new, they are cheaper than many of the premium aftermarket units.

Tires-

- Certainly a matter of preference, but I want high mileage AND handling (who doesn't?). I recommend Dunlop D401s, Elite IIs, or Metzeler ME88s front and rear. Dunlops are a better value, and even work well at the track. I ran a set of D401s (they're getting hard to get, Harley sizes only now being produced) at CLASS at Willow Springs. They never lost traction and performed GREAT! I've run many different tire combinations and will mail you my analysis with the ignition timing procedure, if you want.

Transmission and Final Drive

- **This is very important!!!** Routinely clean and lubricate clutch and driveshaft splines, at least every year or 20K miles. I've had two spline failures at the final drive end. A good rule of thumb is to grease these EVERY tire change. I know, it's a pain, but it's not hard to remove four bolts, pull the drive back, and do your thing. It's SOOOO expensive to face the alternative!
- Use 75-90 gear oil, again laced with 3-5% Gear Guard moly. You will notice measurable shifting improvement.

Summary:

Louis, you can see I've done nothing radical to this machine other than relentless preventive maintenance, peaking of specs, and, I might add, keeping the motorcycle spotless. Routine cleaning uncovers problems as they develop, keeping you ahead of the game. OK, I am experimenting with a wide KRS 18" rear wheel with radials. Requires machining and some workarounds though, but the bike looks neat! So far, so good.

Good luck with your bike, and give me your address if you want the mailings. Happy wrenching! Work carefully and methodically and QC your work!

Later!!!

Rob Lentini <roblentini@cox.net>

Bypass the K1100 Sidestand Cutout Switch

By Bruce G. Keahey
June 2000

As one who has in the past repaired far too many butchered wiring harnesses, here's how to bypass/eliminate the K1100 sidestand engine kill switch either temporarily or permanently, without altering or damaging the wiring harness. Get BMW part P/N 61-12-1-459-998, called a "contact ring".

It's actually a jumper encased in a specially designed connector that plugs into the harness, substituting for the sidestand cutout switch. It enables the engine to run while the bike is on the sidestand for diagnosis/repair. Makes defeating the sidestand switch a one minute operation, and it's completely reversible.

I keep one on the bike, zip-tied to the regular harness wire, just in case my sidestand switch fails on the road. Just remove the right side cover, unplug the sidestand switch, plug in the jumper plug, replace the side cover, start the bike, resume your ride. At about $12,the plug may seem a little pricey, but it's worth the price in convenience and wiring harness damage avoidance.

The question has been asked whether it will fit oilheads. I haven't checked, but a simple way to find out would be to park a K-bike and an oilhead side-by-side, unplug their sidestand cutout switch connectors and compare. Since the jumper plug simply replaces the part of the connector to which the sidestand switch is wired, if the connectors are identical, then the jumper plug fits both bikes.

A word of caution: Because this plug is normally for "Dealers only", so when you order it, don't you talk too much about what its purpose is or why you want it. If you do you may set off the dealer's liability/litigation alarms and encounter resistance/refusal to sell it to you. Better just find a not-too-knowledgeable parts counter person, and simply order it by the above number.

Installing a Sigma Sport "Targa" bicycle computer on a BMW K1200LT (standard)

by Phil Billingsley

06/15/2001

As we all know, BMW speed odometers are notoriously inaccurate. They can be off by as much as 5% - 10% , showing faster than reality. One solution for this problem is to install a bicycle computer. (These are advertised to be 99.9% accurate.) After searching the Internet, I came to the conclusion that Sigma Sport was the computer of choice for motorcyclist. The Sigma Sport BC800, and the Targa seem to the best choices as they have a maximum speed capability of 183 mph. I chose the Targa because: a). it has a metal case, and 2.) it's the only one they had at the bike shop. (There may be other brands (CatEye, etc.) that will work on a motorcycle, but the Sigma Sport models seem to be proven for the motorcycle application.)

All bicycle computers have three main modules; the display, a sensor, and a magnet. The sensor, that is mounted on the front fork, connects to the display/computer by a thin wire. (While there are wireless bicycle computers available on the market today, I don't believe they are suitable for the LT. They require a clean line of site from the sensor to the pickup (display/computer), and have a maximum distance they can transmit.) The basic concept is that every time the magnet passes close to the sensor, another "count" is sent to the display where it is registered. The display/computer then calculates and displays your speed (and other functions).

Installing the BC800/Targa is fairly straight forward. The concept is the same for a bicycle or an 800 lb touring bike. You can follows the standard installation instructions for a bicycle with slight modifications for the LT. There were two basic changes that I made to fit the computer on the LT. 1) the wire that connects the sensor to the computer needs to be lengthened, and 2.) a different magnet will be needed to mount to the brake disk. The best, that I found, replacement magnet is something called a Rare-Earth Super magnet (part # 64-1895) available at Radio Shack. These are incredibly strong little buggers and are about half the size of a very small watch battery. (You'll probably say they're smaller than that when you see them, but that's all I could think to compare them to.) They are less that $2 each and you will need two of them. (the mounting bolts of the brake rotors are not flush and so the magnet needs to extend out in order for the sensor to pick up the magnet as is rotates past the sensor.) I attached the first magnet to the brake rotor using a very, very small dab of epoxy glue. The second magnet is not glued, and I simply put it on top of the first magnet. (so far it has not come off, and others swear that it will stay at speeds in access of 140 mph.)

You will need to decide how to attach the sensor to the fork of the bike. Some people use a standard hose clamp, but I opted for two zip tie straps. To me, this looks a little cleaner and besides, this is what I had in the garage. To clear the rotor bolts, I attached the sensor at a 45 degree angle to the wheel. The sensor comes with a spongy backing that helps secure it to the fork with the zip ties. I wanted a method that would allow me to adjust its position on the fork as well as remove it entirely if needed. I have read where some people will also glue the sensor to the fork for added security, but I have not done this as of yet.

As for installing the actual display/computer, you may need to be creative. However, this was an easy choice for me. Since I have the LT standard model, the area where the BMW computer would be on other models was the perfect choice. By installing it here, I only had to drill two small holes and the only thing I had to remove was the left mirror. That's right, no plastic removal.

To mount the display unit, I drilled the two holes in the left side panel where the BMW computer normally is. These holes were off-set to handle the mounting screw and the wire that leads from the base to the sensor. As I said before, you will need to lengthen the wire that goes to the sensor. If you cut the wire about 24" from the sensor, this will give you some room to work with when you splice in the extra length of wire. This also allows you to run the cut wire into the plastic and down the fork tubing to where it will be spliced back with the sensor. I used zip ties to secure the wire to the fork tubing.

After the unit has been installed and tested to be sure the sensor is picking up the magnet as it passes by at each rotation, you will need to "program" the display unit. You can follow the instructions that came with the computer to see how to change the "WS" (wheel size) setting. The problem with the instructions on the Targa and BC800 is that they give settings for bicycle tire sizes (26x2.0, 700x23C, etc.) and an alternative method of measuring the wheel diameter and then using a formula that they provide. This is all well and good for a bicycle tire, but I found it difficult to get an accurate measurement with the tire still on the LT. What you need is a rollout measurement and formula. There are two easy ways to get this rollout measurement (circumference) 1) Put a mark on the tire and then mark the ground where the tire mark is. Then roll the bike forward one rotation of the tire. Mark the ground where the tire mark hits after a complete rotation.. Take a tape measurer and measure the distance between the two marks. This is what you will need for your calculation. or 2). Wrap a piece of masking tape around the center of your tire. Make a starting and ending mark on the tape (they should be touching, but at different ends of the tape.) Take the tape off the tire and measure it. This is the circumference measurement you will use for the setting.

For me, when I measured the wheel rollout, I came up with 72 7/8 inches (72.875). You will need to convert this to millimeters. If you're like me and don't think in metric, here is a handy site that will convert it for you. In my case the converted number was 1851.025

Take this number and divide it by 1.61 for MPH.

1851.025 / 1.61 = 1149.7 (the setting is whole numbers only, so I entered 1150)

Another method is to take the circumference (in inches) divided by 3.14 x 49.5

72.875 / 3.14 x 49.5 = 1148.8 (setting entered as 1149)

I am not sure which method is the most accurate. I took this and played around with the settings using my GPS and Interstate mile markers to test each setting and then made a final adjustment. Some people will take periodic measurements as their tires wear. This way, they can reset their "WS" setting to allow for tire wear and thus, a smaller tire size. I'm not sure how much off the display would be with say, a half worn tire, but it would be easy to re-measure and see what the difference turned out to be. This seems a bit of an overkill to me. As long as I'm within a mile or two of "true speed" at highway speeds, that's close enough for me.

That is about all there is to it. It took me less than an hour to do all this, but keep in mind that I have installed several of these on bicycles and that I did not need to remove any plastic. I will be glad to answer any questions that I can.

Good Luck,

Phil Billingsley

Phil.Billingsley@comcast.net

How to make K-1100 Handlebars Almost Rigid

By: Bruce Keahey
June 1998

The rubber-mounted bars on my K1100RS (converted to "C" bars) just don't cut it for me. This modification just stiffens them up so that they are *almost* rigid, enough so that they might as well be. Can you say "K1100" and "flickability" in the same breath? Actually, the bars remain rubber-mounted and there is still just a little flex, but handling is greatly improved. So for all practical purposes, they might as well be rigid. With this modification, there is slightly more vibration in the grip, but in the few miles I've ridden with it so far, it's not objectionable, but it's too soon to be sure. Vibration will probably vary with the state of engine tune and accumulated mileage. The modification is completely reversible if you don't like the result. But you probably will.

What we're gonna do is use some bronze thrust washers to compress the original rubber pieces into a smaller space than before and allow them much less room to flex as the bars torque due to rider input and cornering forces.

In the nuts and bolts section of your favorite hardware store, get 2 bronze thrust washers, 1" O.D x 5/8" I. D. X 1/8" (approx.) thick. That's all you need. Using thrust washers is neat because they're bronze, so they won't corrode, and you can specify both the O.D. and the I.D. A 9/16" I.D. *might* work, although the hole might be too small, as discussed below; I didn't disassemble things enough to make sure, and the larger hole is not detrimental. If you'd *like* to have a little flex, just use thinner washers. Or if you can't get the specified thickness, you can stack up thinner washers. My cost was 2.38 plus tax for the recommended size. Now to the actual conversion. Five steps, as follows:

1. Remove the black plastic nut covers from the handlebar mounting nuts on the *bottom* of the upper triple clamp, if they haven't already fallen off and gotten lost.
2. Remove the handlebar mounting nuts that the nut covers cover, and the big, thick round washer above them, between the nut and the rubber. Disassembly stops here.
3. Place one of the thrust washers on the handlebar attachment stud, from the bottom, up against the rubber. Replace the big, thick, original washer and the original nut, finger tight.
4. While holding the thrust washer so that it's centered, snug up on the nut. There is a sleeve in the rubber piece through which the handlebar mounting stud passes. This sleeve must to pass *through* the hole in the thrust washer you've added, and bottom out against the original washer as you tighten the nut. When everything lines up, tighten the nut until you feel the sleeve bottom out against the original washer. Tighten further depending on how comfortable you are at avoiding stripped threads.
5. Now do for other side. Replace nut covers. Go for a ride. Grin *real* big.

Adding a Wider Rim to an Early K100RS

By: Mac Kirkpatrick
March 1999

Try Kosman Racing in CA, 415/861-4262 for a widened rear rim. It makes it so you can run many more of the popular radials, which I liked on my '87 K100RS Motorsport. They modified my rim about 8 years ago.

Luftmeister also had Kosman widen rims for them and then they resold them so you may be able to find used widened rims out there somewhere.

Another way to go is to use rims from say a '91 4 valve K100RS which is the necessary width in the rear and the front is wider also I think. It has a three spoke pattern which you may like better. Life is choices!

You must modify the center stand to clear the wider rim. Try RK BMW in Deptford, NJ (609/228-5275) for that. Tell them I told you to call them. You will have to repaint the wider modified rear rim.

Do you own a BMW K75 or K100 motorcycle with one of these OEM windscreens?

If you own a BMW K100 or K75 motorcycle and you have the standard windscreen (BMW part number 46 63 2 303 245), you know about the incredible amount of buffeting and noise that you get from the air pouring off that screen and right onto your helmet. I tried every solution I could think of, including replacement windscreens from other vendors, but nothing seemed to work. I kept thinking that if only the windscreen was about 2" higher and pushed a bit forward, it would be perfect.

I was seriously ready to trade in my BMW on something else, when I came across the idea of making a set of spacers that would screw onto the existing upper support brackets and would push the windscreen forward and up. I spent a lot of time and money on figuring out the ideal solution, and it works!

NOTE: If you are over about 6' tall, these may not work for you! One user is 6'4" and moving the windscreen forward made the buffeting worse for him. I am 5'10" tall; I estimate that the spacers moved the buffeting from around my ears to the top of my helmet, about 2". So if you are taller than about 6', you may still have buffeting problems, and I'm afraid there is probably no cure if you are a K75 or K100 standard owner. 8-(

These spacers are CNC precision machined from 304 stainless steel to my specifications. It is a very simple, 5-minute job to unscrew the nuts on your upper windscreen attachments and screw in these spacers.

The Results: Measured from the top front edge of the gas tank filler cap, these spacers move the top of the windscreen from 18-1/4" high to 20" high. They push out the windscreen from 14-1/2" from the outer edge of my helmet visor to 18-1/4". On my bike, it completely removes the buffeting and gives me a nice pocket of still air to ride in. I can even ride with my helmet visor fully open with very little noise! I'm 5'10" tall, and I can very easily see over the top of the screen. This has completely changed my opinion of the bike from "ready to trade" to "this is a great bike"!

I'm not claiming that this fix has completely eliminated buffeting and noise. But I estimate that 80-85% of the buffeting has been eliminated. I honestly hated the original windscreen -- I had to do something or sell the bike. I always wear Moldex PuraFit 6800 earplugs, inserted properly, but the noise in the original configuration was punishing. I really like the way the bike works now -- I can hear sweet engine noises I never knew where there. Now I know why they call it a whiner!

For More Information:

- Here are before/after photos of the windscreen with me on the bike.
- Here are installation instructions for the spacers.
- Here is a copy of the drawing if you'd like to get them made for yourself; it should cost between $35 and $50 to have them made at your local machine shop.
- More tips from webBikeWorld visitors on how to fix BMW windscreen buffeting.

Do these spacers work? Here's some unsolicited feedback:

- *"Rick, you should market, box and sell your spacers. I used them today and I must tell you, as you already know, they are amazing. It was incredible to actually ride and not suffer from so much buffeting and wind noise. I love being able to hear my engine, exhaust tunes and most of my surroundings. I really enjoyed my ride in and out of work today. It was truly amazing...."*

- "After reviewing your article I installed windscreen spacers and I gotta agree they work great!...(In our state) we can ride without helmets. So I can really tell the sound reduction... AND as a benefit the bugs are airlifted right over my head (usually!)."

- *"Found your great advice on the web. I'd put over 140,000 miles on my '84 K100, and added the fairing last year but I was so disappointed that I took it off. Took your drawing to a local machine shop. Estimate was $50 for all the metric work, but if I changed the top threads to standard he dropped it to $30. Money well spent, I'd say. Put them on, and I'm loving my fairing now. What a magnificent difference. Thank you so much for the drawings. I'd have never been able to do this without them. This is what the web was made for."*

- [NOTE: This visitor adapted the design (see "more tips")]: "Not quite as nice as the machined SS design you have on the website. Nor quite as long, but it works. My wife, who is 5' 6", immediately saw a difference in wind buffeting and has since ridden out to Vegas and back to Philadelphia with her K75. Another happy camper. Thanks for the great idea on the adapter though!!!!"

- "*Thank You Rick, The spacers are working awesome on my K75, you're an ear saver, it's just as quiet now without my ear plugs in, can't imagine how quiet it will be with them in now that I don't have the wind buffeting in my helmet. I was charged 40 bucks, and met a great machinist."*

- I just came back from my first test ride. You were absolutely right: it works! It doesn't remove the buffeting totally but it helps a lot. Before I have the spacers cut (they asking me 60$ cdn around here) I made a test with couplings and bolts -- metric hardware is easy to find in Canada. Cost me two bucks! Because I am a 6 foot tall rider, I had a little doubt it would work, but it does! It is not as quiet as being behind a real big fairing but it will save my ears... Thank you again. By Monday I will be at the machine shop to order. That gave me the opportunity to meet a great bike-fanatic guy ! So long and ride safely. Long live the K75!

K100 Rattle Fix

By Greg Hertel
April 1998

My 1985 K100 developed an infuriating rattle at 25000 miles. The rattle was a ticking sound and that seemed to come from the upper left hand side of the bike. It was worse at idle or at least more noticeable and I had visions of piston slap, cam chain slack, fuel pump failure, and other expensive problems. The local shop tried for 4 hours to isolate the problem and failed.

I finally got out my trusty stethoscope and found the trouble to be in the fuel return check valve! The only purpose of this valve is to allow you to take the tank off without spilling fuel all over. In later models, it was replaced with a standpipe that extends to the top of the tank.

To fix, you will need to remove the tank and unscrew the the valve assembly from the return petcock at the bottom of the tank. Look down into the petcock and you'll see a spring and a ball. Pry up the tabs and remove the spring and toss it away. Leave the ball and bend the tabs back. Fuel will weep without the spring in place but it still works pretty good for what it is supposed to do.

The clicking will go away and peace of mind will return.

"Modify, Don't Replace Your Centerstand!"

By Don Hamblin
November 1998

Minding my own business, I rocked my '85 K100RT up on it's centerstand. And then noticed that it just kept on going! Powerless, I held the lift handle and grip as it collapsed over onto my wife's minivan. Not a good position for either the auto or my marriage.

After calling for help, the tired K rested on its sidestand.

Calling the local dealer didn't brighten the day. I learned two things:

1. It isn't unusual for the centerstand to either crack or break.
2. It costs over $100 (which I really didn't have to spare that day) to replace it.

So I removed the offending member, and took it over to a friend of mine's to "see what he could do." A couple of weeks later I picked it up. He'd welded the "break" and added a substantial brace to the "leg" that had broken. Fantastic! I rode for a couple more years without any problems.

Then, while removing a SuperTrapp exhaust system, I noticed that the weld had cracked. I also noticed after installing a stock '85 exhaust system, that the brace kept the stand from retracting all the way. Back at the dealers again, I found that the price was well over the earlier $100. There had to be a better way.

This time I called a different "friend" to help (OK, I'd moved, and the "original friend" lived 450 miles away.) We removed the stand, and started looking at the clearances. That brace was clearly in the way, but I had even less confidence in just re-welding the stand. So we scouted the garage for something else to use as a brace.

Under a workbench we found a piece of "stock" about 1/8" thick. With a little cutting and fitting, we welded a "new" brace right into the curve of the leg. This puts the "meat" of the brace right over the points where the weight of the bike rotates. That spreads the "force" over the entire leg and doesn't concentrate it at the bend. Filling all the gaps with "welding rod" also removes those places where rust could hide. A very important step was to douse the hot stand in water. A little heat treating never hurt anyone!

The attached photo shows the stand before painting. That way you can see exactly how the brace should be welded into the curve of the leg.

A wire brush and some paint finished the mod. Proudly we admired our handiwork.

Then the next morning I looked at the Moto Guzzi parked next to me at work. Its stock stand was reinforced exactly the same way! I don't mind following someone else's proven track.

Four months later I've found no evidence of cracking on the stand. In fact, I feel more confident of this stand than any other BMW stand I've ever used.

Did it always lean over that far?

By Don Hamblin
April 1998

WARNING: *Yep, this is another one about the famous BMW sidestand. But this one doesn't complain about what came with the bike, suggest spending a bunch of bucks for something from the "aftermarket" ads, or even remind you not to load your ride like a single track truck. The goal here is to fix your problem, until you can afford that brand new RT, RS, Cruiser, or Vespa.*

REAL STRONG DISCLAIMER! Be Real Careful!! Fire is Dangerous!! Gas and Oil Burn Quickly!! So do garages, motorcycles, and people! On 16V'ers and bikes with interlocks - REMOVE THE STAND BEFORE HEATING!! I won't be responsible for replacing your switches, oil pans, tires, friend's garages, clothes, or complete motorcycles. This is how I did it on "MY" '85 K100RT. Everything still works OK; I didn't burn down my friend's garage, and didn't fry the electrical stuff. But I'm real scared of fire myself! Fire is the big danger! (I'll say this again later, so be prepared to see it again.)

Now for the story:

Don't know if this has happened to you before, but it happened to me. I didn't remember my K-RT leaning that far over. After throwing a leg over the saddle I didn't seem to be as strong as I had been. In fact, it took way too much strength just to get the thing vertical enough to go for that long awaited ride. Then I noticed that the stand didn't retract *nearly as far as it used to!* ***The darn thing's bent!*** The next thing that happened is that I went to get my "*Harley wrench"* (OK, so it's really called a five pound hammer) to beat it back into shape.

My guess is that most others won't admit to it, or would rather just blame those nice folks in Germany, for poor design or something. Mine bent because I didn't check my tiedown straps during a 500-mile trip inside a U-Haul trailer. The bike ended up bouncing on the sidestand for around 450 miles! Yours could have been from overloading with camping gear (or adult beverages). It doesn't really matter how it got bent. The fact is that it ain't right.

Back to the *Harley wrench.* **DON'T!** I know that it can be beaten back into shape. The problem is that there's some weird things that happen to the metal itself (I don't know, grain or molecules, or some of that stuff that engineers say with that "knowing" smirk on their faces) when beaten repeatedly with a hammer. If it doesn't break on the seventh swing of the hammer, it does eleven months later at an Interstate rest-stop (or maybe at a rally registration, in front of the in-laws, or during your first meeting with a bunch of new riding companions.) Then it becomes another opportunity for everyone to blame those nice folks in Germany.

Instead of the five-pounder, how about bringing out that butane torch you had to buy when the water pipes froze last winter?

Those engineer guys (I mentioned them earlier) would rather see you heat the metal before hitting it. Just put it on the center stand (as long as you've kept an eye on it for cracks and it hasn't broken too), and lower the offending sidestand.

REAL STRONG DISCLAIMER AGAIN! Be Real Careful!! Fire is Dangerous!! Gas and Oil Burn Quickly!! *On 16V'ers and bikes with interlocks - REMOVE THE STAND BEFORE HEATING!! If you need to, look in your shop manual (if you don't have one, you should get one and read it before doing anything not detailed in the owner's manual) and see if there's any electrical stuff near the stand.* **But be even more concerned with "combustible" (that means that it might BURN) stuff near the torch! I won't be responsible for replacing your switches, oil pans, tires, friend's garages, clothes, or complete motorcycles.**

If you had the "good sense" to remove the stand, place one end in a vice. (I didn't, but that's my problem.) Then apply the heat to where it's bent (it's supposed to turn "cherry red" so don't worry about that), clamp a vice grip on it, and push real hard. Don't worry, it'll take a number of times and a lot of leaning. Just reheat all around the "bend" and push over and over.

You'll also see that it seems to "remember" better than your teenage kids - when you let off the pressure it'll try to "spring" back to that bend you didn't want. Something like the *Nike* guys, you just have to do it over and over. When it's finally the right shape, those engineer guys might tell you to "douse" it in water to temper it (I didn't, but again, you're on your own - it worked for me, and I guess the molecules, or grain, or whatever, ended up near where they were supposed to be). Then clean off the rust (oh yeah, I hadn't watched the sidestand for rust either) and soot, then spray some paint on it (not a good idea to let it rust after all the work you just did). It might not be as good as new, only better than when you started

I know that this sounds like it takes a long time, but it only seems that way. Mine only actually took about ten or fifteen minutes. It just seems longer when you've got a torch aimed right under about five $4.25 quarts of BMW 20W50 oil. Take your time, a watched crankcase doesn't boil.

And in the future, remember to watch how you treat that appendage!

K-Bike Stand

By: Don Eilenberger
September 1997

First some ascii art work.. then an explanation and the attached photos.. (FAQ follows):

My K-Bike Stand (with thanks to T-Cora for the inspiration):

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The basic construction is a piece of 1/2" plywood 3'x2' with 4x4 pieces attached to it from underneath using 3" galvanized decking screws. The spacing of the two parallel 4x4 members is such that your front tire can just fit between them (in my case 4.5" apart). You can build this from one scrap of plywood and 1 8' 4x4 and two large "eye" rings/bolts. The EYE rings/bolts are mounted to the crossmember 4x4 by counterdrilling a hole from underneath large enough for their nut and washer. I used 3/8" EYE bolts with 3" of threaded shaft (I would not use wood-screw based ones). ("X" in the ascii-art = the EYE bolts..)

To use it - I placed the front wheel of the K into the space between the two parallel members and used tiedowns to hold it down while lifting the bike with a jack under the engine.

DETAILS on how *I* used this stand (see disclaimer at end):

1. I put the bike in the stand: To get the front wheel into the stand - while on the centerstand, I had someone push down on the rear of the bike lifting the front wheel about 1". I could then push the stand under the front wheel.
2. I tied down the bike: Using suitable tie-downs, attach them to the bottom of your triple tree (at least on the RT and RS) and the EYE bolts in the stand. I had someone stronger than me pull them down, alternating from side to side, until the bike suspension is *almost* bottomed out.
3. I lifted the bike: Using a suitable jack (I have a 2-ton garage hydraulic jack) under the rear portion of the engine (I'd also used a block of wood to protect against metal to metal contact) - I lifted the bike.

It *did* feel unstable at one point during the lifting - in my case it started lifting the front end (and the stand). At a certain point - the weight transferred to the front wheel, the stand returned to contact with the floor - and the bike felt VERY stable. I **STRONGLY** liked that during the lifting and lowering of the bike - I had at least two people available to help steady it.

If all this sounds like a chore - once we did it and realized how steady it was, it was a snap to raise and lower the bike using the floor jack. A scissors jack may be a suitable and lower cost alternative to the hydraulic floor jack.

If I didn't use my hydraulic floor jack I would want to make very sure that what I did use has a stable base/ design and was rated for well over the weight of the bike.

```
=======================================================================
LEGAL DISCLAIMER - what I did worked for me. You may be a klutz and
kill yourself if you try this. If so - it's your fault not mine. I
just told you what worked for me.. I did *NOT* tell you to do it, nor
do I encourage you to. If you do this it's your problem if you hurt or
kill yourself or anyone else or break your bike or nuclear war starts.

So there. Jeeze - lawyers!
=======================================================================
```

Photos attached:

bike-stand1.jpg and bike-stand2.jpg show the stand with the K100RT in it..
not lifted in bike-stand1, and lifted in bike-stand2.

K-Bike Buyer's Guide

By Don Eilenberger
November 2001

First off: You must do some homework, and read most all of the K-tech pages. Lots of reading, but worthwhile. This will give you a grounding in K bike tech.

Specifics to an '85 (and not RT specific):

1. Heat-shield on exhaust will probably rattle
2. Mileage on odometer is bogus unless supporting documents are available (like service records). The speedo *has* been repaired or replaced under warranty. Plan on doing the additional work on it outlined in the K-tech-pages.
3. Throttle-cable: If the adjuster is about 8" down the cable from where it enters the twist-grip - it should be replaced (for free by BMW).
4. Centerstand: If the triangular reinforcing piece on the centerstand is welded all the way around, eventually the stand WILL break, tossing the bike on it's side. If it is open at each end it has been replaced with the newer design already.
5. Mid-year '85 update to the K100 (and retrofitted to most of them) involved new footpeg mounting plates which are SOLID mounted to the transmission. If the ones on it are rubber mounted, this update wasn't done. It helped lessen buzz in the left footpeg.
6. Fuel lights probably don't work correctly. Common on '85 model. Cure is to remove them and replace the clock with a Fuel+ (see IBMWR links page and K-tech page for Fuel+ info)
7. There are probably leaks in the clutch area. Bend down, look at the bottom of the clutch housing (bell-housing in my terms, secondary-housing in BMW talk). There is a hole in the bottom of it - you'll probably see oil around the hole. This means you will want to plan a replacement of the rear main seal and the clutch basket nut O-ring. One of our members just completed this and is writing it up. This is a good time to do the spline lubes outlined in the Tech-pages.
8. Consider the possibility that the final drive input shaft and the driveshaft are worn. Not uncommon if they weren't lubed regularly. This can be checked fairly quickly (you DID find this in the tech pages right? Anton's way?) - but it requires disassembly of the swingarm/final drive to do so - most sellers won't allow this. Factor in about $450 to repair this.
9. Figure the rear shock is garbage - allot $300-900 for a replacement (allotment based on how good a shock you want).
10. Figure you WILL be replacing most of the rubber bits on the engine at one time or another. Figure your own labor if you intend to do it and $100 or so for parts.
11. Check that the cooling fan turns. Using your right hand, reach in the gills on the right side of the fairing. Your fingertip should JUST about be able to reach a blade - if it turns fairly freely - the fan is OK. If it is very stiff or frozen - figure $100 for a new fan and about 4-6 hours labor to install it.
12. Look at the brake reservoirs. If you can see the rear one without removing anything, it's the original and will be due for replacement. Is the fluid light-straw colored? If so: good. If darker: then figure the brakes have been neglected. Best case: just needs a flushing. Worst case: may need new master cylinders both front and rear (figure $300 or so in parts) since these seem most effected by neglect (failure to do an annual flushing).
13. Look under the front of the engine. *Any* signs of oil or coolant dripping from the lump on the very front means the oil pump or coolant pump seals are kaput. On an '85 I'd recommend replacing the pump as a unit with the newer design. Figure $350 in parts and several hours in labor.

That's about it. The list above and reading the Tech-Pages should give you a good idea of what to look for and ammo in bargaining the price down depending on what you see.

The bike should start easily when cold or hot, and run like a cat with it's tail on fire... :-)

Don Eilenberger, Spring Lk Hts, NJ JMP#1 deilenberger@monmouth.com
NJ Shore BMW Riders web page: http://www.njsbmwr.org/
Moderator BMW E39 Enthusiast Group: http://groups.yahoo.com/group/bmwe39

FAQ Facts K100

By: Brian S. Brumfield

1.0 General Information

First sold in Germany in 1983. First US models available in 1985. ABS first available in 1987? The upgraded ABS-II was released in 1991?

- K100: un-faired, moderate rider posture,
- K100RS: sport fairing, 3/4 cafe rider posture,
- K100RT: touring fairing & rider posture (taller/wider handle-bars).
- K100LT: touring fairing & rider posture with major touring goodies.

1.1 Year-model Specifications

Engine:	Valves	Displacement	Horsepower/Torque @ RPM
1985	8	975cc	90bhp/203ftlbs @ 8000
1986	8		
1987	8		
1988	8?		
1989	8?		
1990	16?		
1991	16?		
1992	16?		
1993	16		
1994	16		
1995	16		

ABS Brakes	
1985	Not Available
1986	Not Available
1987	ABS-I
1988	ABS-I
1989	ABS-I
1990	ABS-I
1991	ABS-I
1992	ABS-I
1993	ABS-I (K1100)
1994	ABS-II (K1100)
1995	ABS-II (K1100)

Suspension:	Rear	Front
1985	Monolever	Telescopic Forks
1986	Monolever	Telescopic Forks
1987	Monolever	Telescopic Forks
1988	Monolever	Telescopic Forks
1989	Monolever	Telescopic Forks
1990	Monolever	Telescopic Forks

1991	Monolever Telescopic Forks
1992	Monolever Telescopic Forks
1993	Paralever Telescopic Forks
1994	Paralever Telescopic Forks
1995	Paralever Telescopic Forks

2.0 Manuals

2.3 BMW Shop Manual

2.1 Clymer

$18 to $40 US. This is a fairly good manual. Some repair procedures have been omitted, such as the replacement of the oil sight-glass, but most major procedures are explained in a clear manner. The index does leave a lot to be desired.
Electrical diagrams are included for the year-models covered by the manual.

2.2 Chilton

3.0 Water/Oil Pump

- 3.1 Fluid Seeping from the underside of the Pump This may be what BMW considers to be a normal condition. Consult with a BMW mechanic. This could be either one or a combination of oil or coolant.

- 3.2 "Early Production" K100's have a water pump design problem that was later corrected. On the problematic pumps, the impeller is held in place to the it's drive shaft with a nut, threaded onto the shaft. This nut, and it's counterpart are notorious for breaking off of the shaft. In some cases the nut rolls around until it punches a hole through the pump cover, in others it just rolls around. If the impeller is not damaged it can be reused, requiring that the hole be "cleaned out" by running an appropriately sized drill-bit through it.

  Symptom: A high pitched squeal coming from the bike, sounds like a faulty fan belt on an auto. Sometimes there is a hole in the pump cover, and in this case it will leak fluid when the engine is shut down (it actually runs in this condition - not a recommended practice).

  The factory "running fix" was to change the pump's drive shaft with a tapped hole instead of a threaded shaft. The water pump's impeller is then held onto the shaft with a bolt, run into the shaft and torqued to specification.

Retro-fit/Fix:

- 1. Replace the pump assembly (may not come with a cover), $333 US.
- 2. Rebuild the pump assembly:
  - a. shaft $120 US
  - b. slipring seal $30 US
  - c. pump cover $40 US
  - d. assorted seals, etc. $10 US
  - e. impeller $?? US

4.0 Electrical Accessories

- 4.1 Real Fuel Gauge
  - Not available on 1985 K100s without *extensive* modifications, including a new gas tank.

- 4.2 Volt Meter
  - Easily installed (*requires the removal of the gas tank). Useful item.

- 4.3 Heated Handlebar Grips
  - Approx $120 US, about 1 hour to install (*requires the removal of the gas tank). Very useful.
- 4.4 4-way Emergency Flashers
  - Approx $70 US, about 1 hour to install (*requires the removal of the gas tank). Very useful.
- * The main electrical box and "pig-tail" connectors for accessories are located directly under the fuel tank in the main electrical box.

5.0 Exhaust System

- 5.1 General Description
  - The factory K100 exhaust system is a tuned stainless steel set up, in a configuration that takes all four exhaust pipes into the muffler, as opposed to a four-into-one configuration like a header for an auto.
- 5.2 Cleaning
  - The stainless steel requires periodic cleaning to remove dirt build-up that can result in corrosion and rust.

    A yellowing/browning of the exhaust pipes is normal, and can be removed with cleaner. Polishing is not required, and actually could be considered a waste of time, but can add a little jazz to the overall appearance of the bike (if you're concerned with such things). A *light* coating of oil (such as WD40) will mostly burn-off, but help slow the yellowing process.

5.3 Heat Shield Problems

- 5.3.1 Rattles
  - This is a very common irritation to K100 owners. The most common rattling problem is a loud, low/mid-RPM (around 2400) induced rattle coming from the lower left-hand side of the bike.

    This design is plagued with problems that cause rattles, including:

    1. Stainless steel brackets welded to the muffler which hold the nuts to secure the shield, deteriorate, rust, break, etc.
    2. The stainless steel nuts may deteriorate.
    3. The wavy washers used in conjunction with the small bolts which hold the shield on, flatten, resulting in loose bolts.
    4. The bolts are fairly soft, and excessive tightening can damage the bolt heads.
    5. The paint can come off of the shield, and may create a gap under the bolt heads/ washers.

6. The heat shield may be lightly touching footpeg assembly, which requires a slight position change of the shield to remedy the rattle.
7. The side/center stand bumper may be badly worn, causing vibration between the muffler and stands.
    - ** The use of "Lock Tight" on the heat shield bolts is highly recommended not to mention very helpful **
- 5.3.2 Solutions

    - BMW has a retro-fit kit that replaces the standard heat-shield attachment hardware. The kit is about $90 installed and eliminates almost all of the above problems.
    - Luftmeister and SuperTrapp sell new exhaust systems for around $400 that do not incorporate heat-shields, and consequently don't have any of these problems (and add horsepower to boot).

6.0 Clutch Cable

- 6.0 General
    - The cable is routed from the handle bars, under the fuel tank, down the left-hand frame, and is held in place with "tie wraps" and plastic cable restraints.
- 6.1 Breaking
    - There can be a couple of problems here. BMW says that the clutch cable should basically last the life of the bike, but some owners find that they have been through two or three cables.
    - The most common problem is that the cable snaps right at the clutch lever, leaving the round "bearing" from the end of the cable in the clutch lever. This can be caused by:
        1. A burr in the lever assembly that needs to be removed, but the most common problem is a maintenance issue,
        2. The "bearing" that rides in the clutch lever is not lubricated well, or has gotten dirty enough that it doesn't rotate when the clutch lever is pulled. This kinks the cable each time the clutch lever is pulled, until it's strength is compromised to the point that it breaks (usually at an inopportune moment - syncro-shifting can be an invaluable skill!).

7.0 Throttle Cable

- 7.1 Early model K100 Adjustment (years???)
  These bikes use an inline expansion assembly approx. one foot down the cable from the right-hand grip; it usually ends up just in front of the leading edge of the gas tank (requires reaching through the fork holes in fairing, or just reaching around the forks behind the instrument pod.
- 7.2 Later model K100 adjustment (years???)
  The later models use a conventional lever mounted adjustment, such as the clutch cable adjuster.
- 7.2 Don'ts
    - Don't try to adjust the cable in the vicinity of the throttle-bodies. This could throw-off the fuel cut-off (throttle closed) switch, causing fuel consumption problems and backfiring.
    - Don't try to adjust the cable at the grip/cable-head. The grip's teeth mesh and the "cable-puller" gear assembly have index marks which need to match to provide full throttle-range operation.

8.0 Tune-ups

- 8.1 General Description
  The K100 is an advanced vehicle, with electronic ignition and fuel injection, requiring minimal

"tune-up" style maintenance. Sparkplug, oil, and air filter changes top the list of routine maintenance items. More in depth maintenance includes renewing the front fork oil, brake fluid and coolant, synchronization of the throttle bodies, tire balancing, and the "spline lube" operation.

- 8.2 Don'ts
  The "hall effect transmitter" can be adjusted to effect ignition timing changes, but this should not be done, and requires tools for finding piston Top Dead Center, and the primary ignition coil state. Bad idea - even if it looks like the only alternative, consult with a BMW mechanic!

9.0 Changing the Oil

- 9.1 Capacity
  The K100 holds approx. 4.0 quarts of oil (sometimes a little less).
- 9.2 FIlter
  The filter on the K100, while accessible requires a special tool to remove it (or finger spun by Arnold Schwartzennegger). The oil filter is housed in a "wet" (oil filled) reservoir, sealed by a plate and O ring assembly that is held on with three hex-head bolts. The bolts and plate are directly under the engine. The tool is an aluminum, ratchet-mounted cup that fits over the end of the filter. It can be purchased from BMW for about $18 US, or a suitable replacement can be found at a local auto parts store which may require slight modification (many $$ saved). For instance some have "ribs" on the outside for gripping, but the ribs increase the diameter of the "wrench" so that it does not fit in the reservoir containing the filter. The ribs can be filed off.
- 9.3 Checking the Oil Level
  The oil level on the K100 is not measured by means of a conventional dip stick. On the right-hand lower engine block is a "sight glass" which has a large red circle and a dot in the middle of it. The upper and lower portions of the circle represent the upper and lower oil level limits respectively. BMW recommends that the engine be at operating temperature, and the engine stopped for a few minutes, with the bike on the center stand on a level surface before the oil level is read.

10.0 Transmission Problems

- 10.1 Symptoms:
  Hard to find gears, a.k.a. "first, neutral, second, neutral, second, second, third."
  1. These bikes require some degree of "positive" shifting force, which some people are not used to. Careful "conscious" shifting seems to eliminate this problem (if the following issues are not the cause).
  2. The bike requires, as per standard BMW operating procedure, a "spline lube" every 12-20k miles (some say annually). This procedure eliminates a binding of the clutch disk and the transmission input shaft, which can cause shifting problems to start with. Further transmission problems may result as a consequence of not performing the lube. This requires the removal of the transmission.
  3. The "set pin" on the shifter may have loosened. This results in hard shifting, with "slop" (excessive vertical play) in the shift lever, which may result in the lever ultimately coming in contact with an exhaust pipe. This problem requires removal and dis-assembly of the transmission.
- ** The use of "Lock Tight" on this part is highly recommended **

11.0 Tires

- 11.1 1985 K100RS. BMW recommendations are:
  front: 110,90/18 (Metzeler ME33 Laser (V-rated))
  rear: 130,90/17 (Metzeler ME88 Marathon (H-rated))

V or H rated tires work well on these bikes. A lot of riders prefer V in front and H in the back.

- 11.2 Problems:
  A larger series tire in the front, such as a 110,90/18 can make the front-end of the bike feel very heavy and sluggish in turns, and also very unstable under heavy, bumpy turns.

12.0 Gasoline

- 12.1 Octane
  The K100 seems to be fairly forgiving with various grades of gasoline. 87 octane is the minimum level that you should expect any performance from the bike at all with.
- 12.2 Methanol
  BMW does recommend the use of methanol gasoline with the K100 engine. Some owners say that the bike is a "pig" when running methanol, and others don't.

13.0 Oil

- 13.1 Viscosity and Rating
- 13.2 Synthetic vs Petroleum

14.0 Engine Problems

- 14.1 Hard Starting
- 14.2 Oil Consumption
- 14.3 Knocking Sounds
- 14.4
- 14.5

15.0 Purchasing Parts

- 15.1 General
  Parts for the K100, like any BMW motorcycle, are expensive. From a dealer they are borderline criminal. There are some options to steer you from the impending economic peril that your motorcycle may be leading you toward, and some of those options are discussed below.
- 15.2 Mail Order
  There are a few mail order houses out there for BMW hardware, some more reliable than others, including:
  - Competition Accessories 1-800-543-3535
    Comp. Acc. also offers a *large* BMW catalog of parts, from key fobs to real factory micro fiche for your bike! It's well worth the $5!

K1200RS Tips Page

Abridged Edition

(complied by Larry Wilbers 12/7/2000 5:58 AM)

Introduction

Advice about motorcycling is tricky. What works for one rider may not for another. No two riders have the same ideas about how they want to ride or what they need to do so.

Many of the tips that follow may solve more than one problem. On the other hand, they may not represent the answer for a seemingly appropriate problem.

Use the Tips to generate your own ideas about a problem or technique and not as rigid recipes for the best results.

Note that the new or revised comments and information are italicized and are located at the beginning of each section.

Table of Contents

Mirrors

Handling and Performance

Exhaust Systems

Brakes

Cleaning

Specs

Engine Type	Four stroke in-line 4-cylinder engine / "flying brick" or "brick on its side"
Bore and Stroke	70.5 mm x 75.0 mm
Displacement	1171 ccm
Piston Speed at Red Line	Fastest of any production motorcycle engine
Horsepower	130 Bhp @ 8750 rpm (claimed)
Torque	85 lb.-ft. @ 6750 rpm (claimed)
Compression Ratio	11.5:1
Valves	4 per cylinder, 8 x 26.5 mm intake / 8 x 23 mm exhaust
Valve Actuation	Dual over head cams (DOHC), chain driven
Valve Timing	Intake opens 3 degrees before TDC
	Intake closes 27 degrees after BDC
	Exhaust opens 311 degrees before BDC
	Exhaust closes 1 degree before TDC
Cooling System	Water-cooled by twin radiators with side exhaust ports/ oil cooled by 1 radiator
Engine Oil Capacity	3.7 quarts of API class SF, SG, or SH; CD or CE
Engine oil filter	Spin-on Micronic filter cartridge
Air Filter	Paper-type element
Charging System	14 V, 70 Amp alternator (840 W)
Battery	BMW Mareg, 12V-19 Amp/h low maintenance
Fuel Tank	Polyamide tank with enclosed fuel pump and filter
Fuel Demand	Premium unleaded fuel, 90 (AKI)
Fuel Capacity	5.5 US gallons (20.8 liters) including 1 gal. (3.8 liters) reserve at low fuel light indication
Fuel Mileage	40 mph (range is low thirties to low fifties)
Battery	12V 19 Ah
Clutch	165 mm, single dry plate with hydraulic actuation

Gear Box	Getrag 6 speed, Helical-cut gears with tensioner primary drive
Gear Ratios	1st gear — 3.86:1 2nd gear — 3.02:1 3rd gear — 2.39:1 4th gear — 1.96:1 5th gear — 1.70:1 6th gear — 1.51:1
Final Drive	Shaft
Final Drive Ratio	2.75:1 ratio spiral bevel gears
Drive System	Enclosed drive shaft with two universal joints and integral torsional damper
Clutch	Single plate, dry, hydraulic actuation
Engine Mounts	Rubber
Frame	Chill-cast aluminum load bearing welded aluminum/with honeycomb-cell-structure for greater strength, vibration quenching
Front Suspension	Telelever with leading link pivoted centrally on main frame; with gas-filled spring damper strut / Telelever factory adjusted for 90% removal of front-end-dive
Travel/ Dimensions	4.53 inches (115 mm)
Rear Suspension	Patented BMW Paralever with new swing arm / roadside rear shock pre-load and damping adjustments, single-tube gas-filled shock, variable rebound damping
Travel/ Dimensions	5.01 inches (150 mm) / progressive spring, 7 positions
Brakes	ABS II, hydraulic, dual/single discs with Brembo calipers
Front Brakes	Two 4-piston, fixed calipers with floating rotors, wear compensation
Front Rotors	Dual 12.0 inch (305 mm) floating rotors
Actuation	Hydraulic, DOT 4 fluid type
Rear Brakes	2-piston, fixed caliper with rigid rotor
Rear Rotor	Single 11.2 inch (285 mm) diameter fixed rotor
Actuation	Hydraulic, DOT 4 Fluid type
Brakes	ABS II, hydraulic, dual/single discs with Brembo 4 piston calipers
Wheels	Cast light alloy wheels with double 5 spoke design
Front Wheel	3.50 x 17 MT-H2
Rear Wheel	5.00 x 17 MT-H2
Front Tire	120/70 -- ZR 17 tubeless
Rear Tire	170/60 -- ZR 17 tubeless

Curb Weight	628 lb. (285 kg) wet 586 lb. (266 kg) dry
Maximum Load	1102 lb. Gross vehicle weight (rider and passenger and/or luggage)
Wheel Load Limits	Front = 441 lb. (200 kg) Rear = 705 lb. (320 kg)
Top Speed	153 mph (231 kph)
Quarter Mile	11.7 @ 120 mph (182 kph)
Measured Back Wheel Horse Power	114
Measured Back Wheel Torque	78
Service Intervals	Every 6,000 miles
Tire Pressures	36/42 psi
Overall Length	88.6 inches (2250 mm)
Overall width	33.5 inches (850 mm) over mirrors
Wheelbase	61.0 inches (1549 mm) un-laden
Ground Clearance	5.7 inches (145 mm) un-laden
Seat Heights	30.3/ 31.5 inches (770/800 mm) with standard seat 31.1/ 32.3 inches (790/820 mm) with comfort seat
Handlebar Width	26.8 inches (680 mm)
Steering Angle	62.7 degrees, un-laden
Front Wheel Trail	4.9 inches (124 mm) with rider
Front Brake and Clutch Levers	4 positions
Windshield	4 positions using standard screen and comfort screen options
Seat	4 positions using standard seat and comfort seat options
Foot Pegs	2 positions
Shift Lever	Variable height adjustment with two adjustment points (one for major and the other for minor adjustments)
Handlebars	Several inches of fore-aft adjustment and high-low adjustment using standard bar riser and comfort bar riser options (2000 models come with bar riser option)
Headlight	Asymmetrical low beam, load adjustable, with parking light
Signal Lights	Emergency flashers, self cancelling turn signals
Horse Power to Weight Ratio	0.207 (wet)
Tool Kit	Under seat storage, includes tire repair kit with inflation cartridges
Accessory Outlets	One OEM; second site for add on
Security	Integrated ignition and steering lock
Single-Key Lock System	Ignition, steering, fuel cap, seat storage compartment locks, (optional) saddlebags
Rider Information Display	Fuel and coolant-temperature gauges, digital clock, ABS fault, low fuel warning light, turn signal indicators, gear (1-6 plus N)

Horse Power to Weight Ratio.	The K12RS HP/lb. ratio is 0.207 (130/628 wet = 0.207). With a 175-lb. rider it decreases to 0.162. The new R1100S is slated for 98/504 wet = 0.194 and 0.144 with the same rider. The K12RS has more ponies per pound than the S and you can tell.
Delivered Horse Power	Rear wheel horse power has been reported between 94 and 118. Consider that ram air effect cannot be measured on a dyno. Somewhere around 104 may be correct if based on the most commonly reported figure.

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BMW Options

Comfort seat.

Comfort windscreen.

Comfort bar risers.

Tank bag with map pocket and rain cover.

Tank bag electrification unit; system bags.

Tail rack and soft case.

Wide back wheel (5.5 inches).

Accessory back running lights.

Two different alarm systems (a remote control version is available).

Heated grips with high and low settings (get the Euro-switch for no additional charge).

Back to table of contents.

Reviews and Comments

On The Level, September, 1999

"For those it suits, the KRS is the bomb. This is BMW's GT motorcycle, made to swallow up the sweepers on a Sunday afternoon blast. A joy for those with the skill to use it."

The K12RS corrects some of the shortcomings of the previous K11RS:

1. Minimal vibration;

2. Minimal engine heat on the rider (none with leathers);

3. Gearbox is total perfection;

4. Handling is responsive and sport-bike-like.

A Different Beast!

When the K12RS first came out some BMW enthusiasts were disappointed with departure from the previous K-bikes. The stock bike is best ridden in a sport riding position that is fine for those who want a more aggressive style.

However, this requires a change in riding style for traditional BMW enthusiasts.

BMW now offers a comfort windscreen, comfort bar risers, and a comfort seat. These make for more traditional touring riding position and wind protection. In addition, there are other after-market-items, such as peg lowering kits, to move the ergonomics even more in this direction.

Best Euro Bike, 1998

The German motorcycle magazine "Motorrad Reisen und Sport" annual reader survey chose the K12RS as the Best Euro Bike. 42.2% of the votes went to the K12RS with the Triumph T595 coming in a distant second with 16.6%.

Fastest BMW

Car and Driver, a summer issue, 1998, has a short piece about the fastest BMW being one with two wheels.

Best Deals Gap Time

One owner (JR) has recorded a Deals Gap time of 10.59. He has since acquired an R11S, but we are unaware of a time on that bike.

Motorcycle Consumer News 10k Long Term Test

Loved the handling even with the bike fully loaded.

Raved about the Telelever suspension and resultant lack of dive.

Complained about buffeting with the screen up, but praised it in this position for staying warm.

Motorcycle On-Line's K1200RS Road Test

See http://www.motorcycle.com/mo/mcbmw/98k12rs.

Short Review

Motorcyclist Magazine's major complaint was poor ergonomics. However, the reviewer was 5' 7" tall.

Rider Magazine (10,000 mile test on a pre-production bike)

Positive comments about the engine, adjustable wind screen, and tire mileage.

Noted a gas mileage of 39 mpg, but commented that the bike was ridden hard.

An Evolutionary Step

The K12RS is an all-new-from-the-ground-up bike. As with any new product, problems are not unheard of with the initial production. BMW has been exemplary in addressing problems. For those interested in purchasing the bike, the problems have been solved on the current production bikes and all fixes on earlier bikes are covered under warranty. My bike has nearly 38,000 trouble free miles.

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Accessories

Comfort Wind Screen from BMW

The part number is 46 63 2 347 650. It is taller and wider than the stock screen. And is great for cold weather riding or the taller rider.

Electronic Cruise Control? Maybe

BMW electronic cruise control. The circuit for this accessory is reported to be in the K12RS electronics. The complete package is on the new K12LT.

A few owners have added after-market-electronic cruise controls.

BMW Parts Numbers (not a complete list)

Comfort wind screen, part no. 46 63 2 347 650. (Taller and wider than the stock screen.)

Comfort Seat with more foam padding is 2 cm thicker for the captain and 1 cm thicker for the pillion, part no. 52 53 2 347 311, about $224.00.

Comfort Bar Risers, part no. 71 60 2 337 330, about $118.00.

Two different alarm systems, the remote system is about $188.25.

Auxiliary rear light set, part no. 63 21 1 468 253, about $77.00.

Smooth foam grip set, part no. 32 72 1 467 640, about $9.50.

Repair manual (does not include electronics), part no. 01 51 9 799 595, about $120.00.

Grooved foam grip set, part no. 32 72 1 468 031, about $9.50.

T-shirt with the silk-screened K12RSs is 99000001065.

A 5.5 inch-wide rear wheel option is available.

M Verholen (Germany)

Great after market mods with jewel-like machining are available from Germany: bar backs (several different sizes), and both captain and pillion peg lowering kits. Several kits for the captain pegs. A newer model offers quick changes for transition between sport and tour. The original captain kit has an adapter for changing the shift lever position to go with the lower and more forward peg placement (the kit moves the pegs 1.17 inches down and 1.17 inches forward, with minimal increase in lateral positioning). Also available is a clamp-on back luggage rack platform that clamps onto the BMW stock luggage rack. These products are made in Germany. Great interactive web page. Approximate cost of the above (exchange rate for 1/24/98): Captains foot rest adjuster--$150; Pillion's foot rest adjuster--$150; Luggage bridge--$152; Handle bar adjuster 50 mm, 65 mm, 80 mm, or 100 mm--$106.

http://www.verholen.de

Tail Rack Soft Bag

BMW bag for the back luggage rack is available.

http://www.motorrad.bmw.de/erlebniswelt/motorrad/bruecke.html

Shocking Tank Bag

The BMW tank bag electrification kit mounts on the back of the bag, facing the rider. There are two outlets and a light. It's great for using radar, electrical clothing, etc. Cost advertised by Competition Accessories is about $ 150. (1997)

Oil Cap with Style

RCU Designs sells a new tamper resistant oil filler cap that is black with the Roundel in the center. A special key is needed to remove it. Check with the BMW dealership in Salt Lake City. Attractive and well made.

Lighting

A BMW auxiliary running light plate is available. This goes behind the license plate and adds two red, round, running lights, each about 2" in diameter. The plate is black and unobtrusive.

Horns

Fiamm horns fit the bike. Replace the OEM with one or two. It's available at Pep Boys for $13.00. One version is rated at a whopping 130 decibels. Replacement goes where the OEM sits. It requires removal of the factory plug and replacement with standard tabs.

BMW Tank Bag

Good reports coming in about the BMW tank bag. Easy on and off and at highway speeds it provides a good place to rest your upper body. The hinged design allows easy access to the gas tank.

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Problems and Warranty

Spotting Muffler

The original brushed aluminum muffler spots easily. Cleaning can be a chore. However, the brushed aluminum cover looks good on the bike. Keep the spots off by coating the cover with a spray-on-silicone-lubricant. Use the light as oppose to heavy type. This works for cleaning also.

BMW now has a replacement cover in chrome and a replacement tip needed for the new cover. The replacement tip is painted black. The paint can be removed with polishing to exposure the stainless steel. Some owners had the original cover polished.

Caution: Many prefer the brushed aluminum muffler cover. Removal may result in its damage. Make sure you want to go to stainless steel.

Wandering Tires

If the bike feels like its hunting in turns, you may have a loose Paralever. Check all bolts.

Burping Coolant

Air in the cooling system may cause coolant to flow out of the reservoir under the seat. The coolant may run down onto the drive shaft housing and may collect in the tool kit storage area for the tool kit. Air may be introduced during the annual service when it is changed.

Refilling the reservoir is probably wise if the coolant level is below the minimum mark when the engine is warmed up. Don't add more than is needed to get it into the safety zone as it takes awhile for the air to get worked out and more spillage is likely.

Low Idle and Cold Engine Stalls

The problem on my bike was caused by incorrect throttle cable adjustment. The computer programming software was trying to correct for this and this resulted in low rpm at idle and stalling with a cold engine. The throttle cable was properly adjusted and the problem fixed.

Another owner was experiencing similar problems due to a sticking throttle cable.

Extended warranty.

If you do high mileage this may be a good bet. My bike had 36,000 miles after two years. The extended warranty gives it 4 more years with unlimited mileage and is transferable. .

Suspension Settings and Rough Pavement

The base plate on my side stand was bent after hitting a deep pothole. I surmised the suspension bottomed out and apparently the side stand was then thrown downward toward the on coming trailing edge of the pothole. The base plate then caught and caused the bike to jump to one side. There was never a risk of losing control. However, it wasn't until the bent plate was discovered that the reason for the sideways hop was evident. Replacement was easy and needed since the spring mechanism was also damaged. I now have the suspension set near max for sport rides.

Vinyl Protection

Use vinyl tape to prevent the seat from rubbing against the tank paint.

Gas Leak

Leaking gas tanks gaskets/deformed tanks. This was a warranty recall issue. The newer tanks are rumored to be 1 mm thicker and have a redesigned seal. The part number has not changed. The tanks apparently leaked only in extreme heat and when full. Mine was updated in February 1999, even though there were no previous problems. This is a free warranty fix.

Fan Problems

Fans were a problem on some of the early production bikes. This is a free warranty fix. If fan goes out, don't let the bike overheat.

Snurf Balls

Having trouble keeping your new windshield in the high position over rough pavement. Try stuffing a Snurf ball underneath, between the two humps that house the speedometer and tachometer. As the windscreen breaks in, it becomes more resistant to bumps and the ball is no longer needed.

Blown Seals

Some leaking fork seals reported. If bothersome, these will be replaced under warranty. This is most likely to show up under hard down-hill-braking.

Clutch Slipping?

A loose actuator screw may be the problem. There is a service bulletin describing how to fix this. Tighten the screw and use Loctite for a secure fit. Or see your dealer, as this is a warranty issue and will be fixed free of charge.

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Rumors

A Limited Edition Classic?

There’s a rumor about the 2001 K1200RS being the end of the line.

The thinking. The K12RS engine is a big as it can get. Bore and stroke dimensions cannot be increased.

Then there is the oft-heard complaint that the big Hondas are too big. Many fondly recall the old four cylinder Gold Wings.

And then there is Honda Motorcycle Company heading the other direction with a V-6 ST and an 1800 cc Gold Wing.

A 4-cylinder boxer engine would be shorter than the current inline 4. This would allow a shorter frame/wheel base and the ability to increase displacement. The engine would be water-cooled.

Another advantage would be shared parts with the 2 cylinder versions.

Most Recent Recall Notice (11/19/99)

"The following items require immediate attention:

1. The sealing plugs in the cylinder head can work loose allowing coolant to escape. In extreme cases the engine could suddenly lose all coolant. (Affected VIN number range is ZA21803 to ZA22694).
2. Also, the clip that secures the oil thermostat can work loose. Under some circumstances, engine oil can leak and find its way to the rear wheel, which in turn can place your safety at risk. (Affected VIN number range is ZA20000 to ZA34226)."

Softer Throttle Spring on 99 and Later Models

My shop checked to see if one was available. The rumor is that the 99 bikes have softer springs.

The entire throttle body carries a single BMW part number and there has not been a change in the number since the earlier years. However, this does not mean that a softer spring has not been substituted.

Lower Captain Pegs

Standard foot pegs for the R1100S are said to fit on the K12RS and increase legroom. Check this with your dealer before purchase.

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Engine and Drive Train

Clean Magnets

Changing the rear drive oil. One way to determine amount to be replaced is to measure that which is removed. Also, clean the magnet of any metal debris.

Leaking Fluids

A leaking clutch slave resulted in warranty replacement of a new clutch and transmission. The leaking fluid attacks the transmission seal and it is reportedly easier to replace the transmission.

Horse Power to Weight Ratio

The K12RS HP/lb. ratio is 0.207 (130/628 wet = 0.207). With a 175-lb. rider it decreases to 0.162. The new R1100S is slated for 98/504 wet = 0.194 and 0.144 with the same rider. The K12RS has more ponies per pound than the S and you can tell.

Delivered Horse Power

Rear wheel horse power has been reported between 94 and 118. Consider that ram air effect cannot be measured on a dyno. Somewhere around 104 may be correct if based on the most commonly reported figure.

Use Mobil 1 Motorcycle Oil, not the Automotive Stuff

Mobil 1 Automotive is SJ rated. Mobil 1 Motorcycle is SH rated. These appear to be different oils. SJ is reportedly slicker, giving a small improvement in fuel consumption. SH has more zinc, which prevents galling with oil film failure. BMW requires the use of SH rated oil. It is a warranty requirement.

I use the BMW full synthetic.

Oil Consumption at High RPMS

Watch for increased oil consumption at sustained high speeds.

Rubber Gasket!

Make sure the rubber gasket on the oil filter is removed with the old filter. Leaving it on could lead to oil loss and engine failure.

When to Change Oil

Car and Driver (June), reports that you should use a quality motor oil (doesn't make much difference which one), and change the oil and filter when indicated by the owners manual and not before.

Mixing Dino and Synthetic Oils

Honda makes a 10W40 50/50 mix for high performance riding. Change oil as indicated in your manual, keeping in mind the listed exceptions. Always change the filter at the same time.

Oil Filters

Mobil 1 oil filters are available

Oil Filler Cap

RCU Designs sells a new tamper resistant oil filler cap that is black with the Roundel in the center. A special key is needed to remove it. Check with the BMW dealership in Salt Lake City.

Oil Consumption

Oil consumption is being reported as nil after the 600 miles break-in period (experience of 3 owners), and some have reported no consumption at all. Mine continued to use oil until 20,000 miles, although at ever decreasing amounts.

Good Vibrations

At speed vibration is nil except for a slight buzz at 75 (in sixth).

Oil Filler

How to get oil into that vertically mounted cap. The filler spout would be great if only it were disposable. On the road, while touring, I use a sport-water-bottle purchased at a convenience store (your choice of water brand). Let the bottle dry out and then put in your favorite oil. When needed, squirt in the appropriate amount. Best to buy the bottle type that has a second cap. In addition, I put mine in a zip lock bag before putting it in the luggage. The squirt cap seems not to leak though. Also mark the bottle as poison.

You can just take along the cap and put it on an oil bottle purchased at a gas station.

Additionally, Harley-Davidson sells an attachment that fits on the mouth of a standard oil bottle. Its several inches in length and does the job well. I use one when adding oil at home.

Caution: Some plastics will degenerate with oil contact. Try to use a new squirt cap and be careful not to catch the cap on the edge of the oil-filling hole. The latter can result in the tip being pulled off and dropped into the engine.

Gas Mileage

Varies as expected with riding style. I'm getting 45 mpg with mixed riding. The fuel gauge needle stays in the paint until well past 100 miles while touring at constant speeds and the estimated touring range is 250 miles. Another rider reports about 42 mph but admits to not being throttle shy. I averaged 52 mpg on the Natchez Trace doing 10% over the limit. At 90 mph, another rider reports 35 mpg.

Dry Clutch

Does your bike sound like a box of rocks at idle? This is normal for a dry clutch.

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Riding Position, Ergonomics, and Saddles

Tank Bag Induced Muscle Strain

For some riders, the BMW tank bag limits forward movement of the upper torso. On long trips this may result in riding in a somewhat fixed position and muscle strain.

Better Grips for Less Fatigue

The throttle has a strong spring and may cause fatigue.

Getting a better grip helps decrease effort and improves control.

A cheap fix is to cut sections of bike inner tube, roughen with a wire brush, apply a thin coating of shaving cream to the stock hand grips, and then slip the inner tube segments over the stock hand grips. Make sure the tube diameter is small enough to ensure a tight fit. (Note: This also increases heat output by the heated-hand-grips. See tricks for keeping your hands warm under: Heated Grips/Keeping Warm and Dry/What to Wear)

Another method is to rap the throttle grip with a strip of opened bicycle-inner-tube and secure the end with Shoe-Goo. This increases the diameter of the grip and results in more leverage. (Note: I have used this in a pinch after developing a sore shoulder on a trip.)

Foot Control Levers

You should not have to excessively pivot your left foot, reposition it on the peg or otherwise move from a comfortable position. The K12RS shift lever has two adjustment mechanisms. One is used primarily to make the major adjustment between high and low peg positions. The other is for fine adjustments.

Missing up shifts? Move the lever down. Missing downshifts? Move the lever up. As far as the brake lever is concerned, this should be covered easily.

Still having problems? Consider what type of footgear you use. Sport bikers usually wear boots with little in the way of heel height above the sole. This allows easy fore and aft positioning.

Faux Fleece Seat Cover

Bath mat sheep skin. Use non-slip pad material and attachment straps as needed. Consider using this as a cover for heating pads (heated seat).

Adjustable Seat Latch

The two bolts may be loosened to adjust the location of the latch. The seat should latch without any sloppiness / movement.

Elbows on Knees

You may want to adjust your riding position so that your elbows can rest on your knees when in a tuck position. This takes weight off of your back and forearms. So adjustment of your seating position, fore or aft, may be required in addition.

Lower Captain Pegs

Standard foot pegs for the R1100S reportedly will fit on the K12RS and increase legroom.

Fleece Seat Cover

This will keep your back end cool and dry in the summer and warm in the winter. Get the real stuff.

Cramped Ergonomics?

The ergonomics may feel cramped when you first ride this bike. Some have made immediate modifications while others have gone through a period of discomfort/rider-break-in. Still others have found the bike comfortable from the beginning with no break-in period needed. Because the riding position is different from most other BMWs, it is recommended that you ride the bike for awhile before making major changes. This will give your body a chance to adjust (rider-break-in).

Leg Cramps

The K12 riding position is different from most other bikes and may take some getting use to. Some have reported discomfort after 2 hours (cramps in the thighs). This resolves after more riding experience. I had this problem in the beginning. It was helped by taking frequent breaks, setting the saddle height in the high position, and by making a conscious effort to relax the thigh muscles. This break-in cramping happens more often if you are a runner or bicyclist. It is similar to the hand cramps experienced by new riders and partly due to no relaxing the involved muscle groups. It will pass.

Alter Your Riding Position on Tours

Consider alternating your riding position and ergos on long trips to increase touring comfort and range. For example, handlebars in a full forward position for awhile and then in back a bit. Also see the different riding positions listed above.

Bar Backs

Most require loosening of the cables and wires going to the handlebars. Some minor adjustments needed for the BMW version. The latter are recommended.

How tall are you?

K12RS owners I know range from 5' 4" to 6' 5" in height.

BMW Ergo Options

BMW now sells its own handle bar risers and a thicker / comfort-saddle (2.0 cm. for the captain and 1.0 cm. for the pillion). No peg lowering kits as the thicker saddle and handlebar extenders address the problem of tall riders.

Saddle and Handlebar Adjustments for Sport Riding

Moving the saddle from the low to high position moves your center of gravity (COG), higher and forward. This makes it easier to lie on the tank. Moving the bars forward moves your COG forwards and also make it easier to get on the tank. Consider a tank pad if you don't have a riding suit with chest armor/pad (Dainese makes an under the suit vest with back, rib, and chest armor/padding).

Consider Changing Ergos in Summer and Winter

Use the low seat position for winter riding. This moves your legs closer to the side fairing pockets, increases relative windscreen height, and traps engine heat under the saddle. And with the bars in the same position, it results in a more upright riding position to accommodate winter riding gear. For summer riding, move the seat to the high position for the opposite effects.

OEM Saddle

Ride on the stock for awhile before going after market. Many have found the stock seat provides the best comfort after the butt gets use to it (rider-break-in). This may need to be repeated each spring.

Re-tighten Bar Backs

Remember to retighten the bar backs after a short time to compensate for the teeth becoming fully seated. Use correct torque only. Over tightening is forever.

Best Non-BMW After-Market Ergo Mods

Great after market mods with jewel-like machining are now available for bar backs (several different sizes), and both captain and pillion peg lowering kits. The captain kit has an adapter for changing the shift lever position to go with the lower and more forward peg placement (the kit moves the pegs 1.17 inches down and 1.17 inches forward, with minimal increase in lateral positioning). Also available is a clamp-on back luggage rack platform that clamps onto the BMW stock luggage rack. These products are made in Germany. Great interactive web page. Check it out at http://members.aol.com/mverholen

Use real road experience to determine clip-on (handlebar settings)

Putting the bike on the center stand puts the back end up in the air. This may lead to putting the bars back further than needed. Also remember the wind at touring speed will support some upper body weight. You can try to level the bike with small blocks of wood under the front and back tires when checking ergonomics in the garage.

Balancing Act

A) Handle bar position effects the rider's center of gravity (RCOG). Move the bars forward and your center of gravity is also moved forward. Move the bars back and the reverse is true. Ideally, RCOG should be over the pegs for long distance riding in the sport-touring riding position (as opposed to the formal touring or cruiser riding positions with the feet forward and the back perpendicular to the ground).

B) Moving the bars forward moves your elbows closer together. Your hand angles change and the amount of medial or lateral bending of the wrists required to grasp the bars. As you move your hands forward, the forearms become more parallel to each other. This may be important on the K12RS, as the bars can not be adjusted by rotating in a horizontal plane, only fore and aft, up and down.

C) Arm strength is greatest at near complete extension. However, you don't want the arms locked straight out as this hampers steering ability and increases jarring form pavement bumps.

D) Leverage. Moving the bars forward lengthens the distance to the pivot axis of the steering assembly. This may result in more leverage and less effort. OTOH, steering may feel slightly sluggish, as the bars need to be moved further to accomplish the same amount of rotation. Think in terms of having a smaller or larger steering wheel in your cage.

E) Moving the bars forward also seems to make it easier to slide back in the seat. With the bars in the full back position, my position on the seat is all the way forward. With the bars in the mid- or full forward-positions, my seating is in the mid-range and moving both back and forward on the seat is easier. This may have to do with the RCOG. However, the more forward bar position also results in more hip flexion and this may contribute.

Rider's Center of Gravity (RCOG)

Adjust your riding position so your center of gravity is over the pegs. This allows for good mobility in seat, ease in getting off of the seat, and lessening of fatigue on long rides.

Set the bike on the center stand and make level it with blocks under the front and back wheels. Sit on the bike with your hands over, but not griping the handgrips. Now rise off the seat using your leg muscles only. You should be balanced just after coming off the seat. Rise and lower several times to get a better feel.

If your center of gravity is forward of the pegs, that is you tend to fall forward when coming out of the seat, you have several choices.

> Move the pegs forward (peg lowering plates, all of which also move the feet forward).
>
> Move back in the seat.
>
> Put the seat in the low position.
>
> Move the handgrips aft (the simplest to do-just remember to torque the bolts, but don't over torque!).
>
> A combination of changes may be needed.

If your center of gravity is behind the pegs, that is, you tend to fall back when coming out of the seat; you will have the reverse choices.

Move the grips forward.

Move the pegs to the high position (one rider over 6' is more comfortable with the pegs moved up!).

Lean farther forward.

Move the seat to the high setting.

Again, a combination of changes may be needed.

Handlebar Position

Most riders are comfortable if they can lean forward into the wind. At speed, weight on the handlebars should be minimal as air flowing over the windscreen holds you up. Consider a set of bar back adapters to move the bars aft if the stretch forward is too extreme. Also consider that the wrists should be nearly straight when holding onto the grips. This will help prevent that carpal tunnel thing.

The Handlebar Levers

These should be adjusted so that the tips of your fingers easily slip over them.

Does your left heel touch the top of the side stand lever?

This becomes more of a problem if peg-lowering plates are installed. One owner removed the rubber cap and cut off 1/2 inch.

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Tires, Wheels, and Suspension

Mixing Tire Types

Some riders are using D205/D207 combination, front/back. Dunlop approves of this set up. It works well if you cook the front tire long before the back D205 and you change both tires at the same time.

Tire Pressures Hot and Cold

Some have recommended higher front tire pressures than indicated in the owner's manual. These have been reported as high as 2.8 barr (40 psi). But what does this mean on a tire that's been ridden at near ton speeds for a significant period of time. Most of the bike's weight is up front. Does this result in the hot front tire with a recommended 36-psi cold pressure equaling the hot pressure of the larger back tire with a recommended 42-psi cold pressure?

Tire Pressure, Suspension, Riding Position, and Steering Response.

Increasing running tire pressure results in harder overall suspension performance.

Decreasing tire pressure does the opposite.

Moving forward on the bike, as results when you move the seat to a higher position and thus more *forward position or when you lower the bars, puts more weight on the front suspension and compresses the shocks. The overall effect is less rake (a steeper fork angle from horizontal). And this causes the bike to steer quicker.*

The opposite happens when you move your weight towards the back of the bike or add a pillion or luggage.

Getting on the tank thus makes for quicker steering and the bike feels overall more responsive. And putting a passenger on the back will make the bike feel sluggish.

However, the front-end geometry is a combination of castor, rake, and trail that are carefully chosen to provide the best combination of straight-line tracking and responsive steering without producing a twitchy or unstable steering/tracking.

It is generally thought more rake results in greater straight-line tracking and less results in more responsive steering. Thus we usually see more rake on touring or cruising bikes and less on race bikes.

But rake does not operate in a vacuum, as castor and trail also contribute to the front-end performance characteristics.

Thus, while increased running tire pressure with resultant increased tire diameter causes increased rake, at 42 psi cold, it also causes the front end to get twitchy with my bike set up.

Tire Pressure

Current general consensus recommendation is for 40/40. These are suggested based on a antidotal reports that the bike handles better with this set up.

36/42 psi is recommended in the manual.

My experience is the following:

36 to 38 psi in front have little effect on the feel for how the bike handles.

40 psi in front improve handling but makes for a harsher ride.

42 psi in front result in unstable or twitchy steering.

42 psi in the back tire cause it to square off.

Tire Pressure and Mileage

My experience is that front pressures from 36 to 40 and back tire pressures from 40 to 42 psi show little difference in tire mileage.

New Tires

Have a gravel road nearby with cracked-rock type gravel? A few minutes will take off the shiny even on the edges.

Flats

Low rear tire pressure will show up as sluggish handling with small angle turns and the front end diving too quickly into large angle turns. I have done expressway speeds with only 15 psi in the back (not on purpose!). This results in beading of the rubber and a distinct smell (burning rubber). Also, at night, oncoming drivers will flash their lights at you since the low rear tire moves the headlight angle up. The tire was plugged at an auto tire shop, but continued to leak slowly.

A leaking back tire can lower a parked bike enough to allow it to fall to the right if you are on uneven pavement. For overnight parking, use the center stand.

Plugging a flat tire. The package insert (located in the small plastic green box in your tool kit) indicates a top speed of 37 mph and maximum distance of 250 miles on a plugged tire using the kit.

Clear Coat

The newer bikes have a clear coat over the wheel paint. Cleans easier and has a different look than the original flat finish.

Shock Absorbers

There are a number of after market shocks for the K12RS. Its best to try a fitted bike before making the change as these are expensive.

White Power with adjustable pre-load and rebound damping.

Prices:

Front, 03-06R944, $515

Rear, 03-06R934, $531

Works Performance (Chatsworth, California, USA), front and rear, rumored to be adjustable, may be rebuilt, around $1,000/pair.

The OEM shocks are recommended.

Fork Seals

There is now a new fork seal made of a different material. Said to work better than the first version.

Bent Rim?

Have a bent rim? Send an e-mail to: WireWheels@aol.com

Tim Bond is a member of IBMWR. The wheel can be shipped to him for straightening.

Balancing Act

The balancing adapter tool for the back wheel may be purchased from your dealer. Order BMW part # 90 88 6 363 618. The adapter bolts onto the wheel with four bolts (included or those from the bike?). It can be used for both static and dynamic balancing.

Wheel Detail

Wheels off for new tires? Why not detail them? However, cover the axle hole on the front wheel to prevent water and other substances from getting on your bearings. While you're at it, clean the loose brake dust out of the brake calipers.

Taking the Wheels Off

How to protect the paint when you take the front wheel off. Taking the front wheel off requires removal of both brake calipers. The manual says to protect the rims with tape. Another solution is to put a zip lock bag between the rim and the brake caliper during removal. The brake can then be put in the bag and the bag partly closed. This prevents the brake from scraping the fork paint also. Vinyl tape would also work well as it is easy to remove.

Caution: don't actuate the brakes with the wheels off!

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Side and Center Stands

Adjusting Forward Travel of Side Stand

This has been suggested by some to add further stability against forward roll when parking downhill. They suggest accomplished by grinding down the metal at the stop point on the side stand assembly. This will cause the lean angle to increase such that firmer footing is required to prevent the stand from sinking. However, it will also make those stops on the berm easier (stopping on the berm is not suggested except when it cannot be avoided).

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Wind Screen and Wind Noise

Wilbers' Wind Dots

These are surface guards made by Shepard Industries. They are made of clear plastic and are dome shaped.

Apply these to the trailing edge of the comfort screen (about 1 inch apart) and on the side of the helmet over the ear areas (again, about 1 inch apart), to reduce wind noise. Experiment with placement.

The Wind Dots work by disrupting the build up of low air pressure zones and by forming a thin layer of turbulent air that fast moving air can move over smoothly.

The Colder the Better

Cold water works well to clean bugs off of the windscreen and fairing. In fact, BMW recommends it alone and also soaking the screen with a damp-clothe, if needed.

Silicone Conditioning

Silicone will hide minor scratches in the windscreen and make it easier to clean off bugs with cold water.

Screen Removal

Devise something to compress the prongs on the fasteners. I use a makeshift tool consisting of an acorn nut attached to the end of a pair of tweezers. This allows the prongs to be compressed and forced into the hole. A flat head screwdriver is then used on the other end of the fastener by inserting it into the slot between the bracket and the flat end flange of the fastener and gently twisting. This pulls the fastener out far enough to be removed by hand. The bracket hole liners may be better secured with a reversible adhesive such as Shoo Goo. This keeps them from flopping out when the screen is removed. The fasteners may be reused as long as the tip remains in good shape.

Comfort Wind Screen from BMW

The part number is 46 63 2 347 650. This is taller and wider than the stock screen.

Negative pressure induced wind flutter

Most of the wind noise I experience is due to negative pressure induced wind flutter/pop. Earplugs seem to take care of most of the other wind noise. The negative pressure occurs behind the stock windscreen due to air pressure being greater on the front of the screen than under it. As the difference between the two pressures increases, an amount of pressure difference is reached that causes the high-pressure air to pop into the low-pressure area.

The vent on the stock shield is an attempt to decrease this effect (as are the cat eyeholes on the stock ST1100 screen). To completely eliminate this flutter, you can remove the screen completely and your helmet (and ears), with be in clean, quiet air. I've modified a stock screen by cutting out the central portion form the to down to within an inch of the vent. This results in a tremendous improvement.

Riding position and wind noise

The turbulence occurs in a defined zone. You can try to move your head either above or below it. The comfort seat in the high position moves the rider's head up and the stock seat in the low position moves it down. Handlebar position changes the attitude of the rider's torso and also affects where the head is.

And changing screen position moves the zone of turbulence.

Moving your head forward and into the low-pressure space behind the windscreen also decreases turbulence. This is due to decreasing the volume of air available for low pressure to develop.

The 2000 BMW 328Ci has vortex generators along the upper edge of the side view mirrors to reduce wind noise. Could a similar set-up work on the windscreen?

Silent Speed

Wind noise is reported as very minimal when at 120 plus.

Wind Noise

The amount of noise changes with cross winds, type of jacket collar, type of helmet, and helmet position. Also tank bags, seat position, helmet visor open or closed, and the windscreen in the up or down position. Think in terms of blowing air over the mouth of a Coke bottle.

Plugged Ears

Use a variety of types depending on length of ride and need to hear surrounding traffic. These take care of most of the wind noise. Best comfort and noise reduction requires the plugs to just barely press against the eardrums. It takes some practice and patience to get them just right. Before inserting the plugs, roll them between your forefinger and thumb and then stretch them length-wise. This allows for easiest insertion and less need for adjustment.

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Saddle Bags and Other Luggage

New Left System Case Design

The new case has a deep indentation near the end of the muffler to prevent heat damage.

Three Mounting Points for System Cases

There are black plastic bumpers by the pillion pegs. Their thickness may be altered to adjust for sloppiness or inability to mount the cases.

Givi Top Case

There are two ways to mount the Givi top cases. With the Traveler II, 28 liters capacity, there is an adapter plate supplied by Givi. It attaches directly to the standard BMW K1200RS tail rack. It is constructed of heavy metal and very sturdy. A rubber pad protects the BMW tail rack finish. A plastic adapter plate is added to the metal one. The latter has the snap-on structures that allow easy removal and attachment of the top case. It also has numerous attachment points and can be left on without the top case to attach odds-and-ends. A single lock secures the case to the tail rack adapter and unlocks the case. The Traveler II has an tail light option with an automatic electrical connection device that allows the light to work without doing a wiring job each time the case is taken off or put on. This might be used to power a lightweight CD player and changer if you were so inclined. Speakers could also be fitted to the front of the top case or a plug-in jack for ear phones/helmet speakers. The brake light option may also be available with the larger top cases. (To use the case light as a brake light, attach the supplied extension wires to the brown wire and the yellow and gray wire of the tail light. ñTo use the light as a running light, use the brown wire and the gray and black wire.) The Traveler comes in black/graphite and has an "aerodynamic" shape. This makes a good match with the system cases and the black plastic on the bike. To further the integration, I put a BMW emblem over the GIVI emblem on the top of the case. Covering the attachment-side of the GIVI emblem with vinyl tape (for easy removal) and then a blob of Shoo Goo works. The emblem was taped in place while the Shoo Goo dried. I also added a backrest pad, another option, for my wife. This is secured with supplied bolts. The case is large enough to hold an XXL full-face helmet. My wife and I have done overnighters with the top case as our only luggage. The position of the top case is adjustable, fore and aft. This is accomplished by moving the location of the plastic plate on the metal plate. This allows the backrest pad to be adjusted for the pillion and positioning of a heavy load far forward. Luggage weight should be limited to that specified by BMW. Givi also makes several larger cases. These are wide and low as opposed to tall and narrow. My personal opinion is the Traveler II looks better on the bike but cannot carry the volume or weight that the larger cases can. Also, I have not seen the larger cases in the black color that matches the system cases. If you go to one of the large cases, opt for the Givi mounting hardware that does not use the tail rack. Caution: The bolts holding on the BMW tail rack will vibrate loose if nothing is done to secure them. I tried a bolt locking liquid and this failed. The bolts were then secured by coating them with a thin layer of Shoo-Goo prior to insertion and there has been no loosening since.

Fragile BMW Cases?

I've had no problems with the BMW system cases. For commuting, however, I use a Givi Traveler II top case (28 liters) because it doesn't widen the profile of the bike. One owner's bike has been down twice and the right system bag saved the bike from significant damage both times and was still usable. The second time resulted in the pavement grinding through the plastic. Vinyl tape corrected that problem.

So the bags are sturdy enough to protect the side of the bike in low speed crashes.

On the other hand, and thankfully, impact with another vehicle results in the bag coming apart or falling off. This is a good thing. Better to lose the bag than have the entire bike go down.

Non-Slip Pad

K-Mart sells a non-slip pad, 72" X 24" for about $5. Look for it in the automotive section. Cut a piece that fits on the pillion area of the seat and use it to keep your duffel bag or other soft luggage from slipping around when strapped on the saddle.

Rear Soft Bag

BMW has a soft-top case/bag that can be attached to the back luggage rack or the pillion portion of the saddle. It has a twenty-two liter capacity. There are 3 outer pockets and a rain cover to supplement the water-repellent black outer covering. The bag has two attachment systems. With the rack, it locks onto the bike behind the seat leaving room for a passenger. It also has straps, which allow the bag to be mounted on the seat without the bracket. Four elastic bands with clips for under the edge of the seat secure the bag sideways where a passenger would normally sit. $$$

http://www.motorrad.bmw.de/erlebniswelt/motorrad/bruecke.html

Bicycle Rear Bag

A 650 cu in. rear rack bag is available through Performance Bicycle. You can mail order this with a 1-800 number. It has four Velcro tie down straps that securely fasten it to the tail rack of the K1200RS. Features 3 zippered outer pockets, foam-lined expandable main compartment with removable dividers. Main storage area is pleated for extra room. Holds most U-locks, a six pack of beer with ice, tinted face shield, camera stuff, maps, a rain suit and rubber boots, or etc., but not all at the same time. It is made of 600D rip-stop nylon with a capacity is 650 cu. in. and a choice of black or blue. Detachable carrying strap. Cost is about $40.

Rear Rack

A factory black rear rack that attaches to the top of the silver "RS" rack is available. It has good strength and lots of places to hook things. See M Verholen.

Loose Rear End

Shoo Goo your saddle bag and tail rack bolts. These may vibrate loose otherwise. I've used Loctite without success.

Ready to Rumble

Consider the Eclipse Rumble pack for back seat storage.

An Extra Belt for the Road

The bike belt is a nylon belt with 4 rings on it. It has plastic buckles on each end that snap into holders bolted near the rear foot pegs. It goes across the rear portion of the seat. Easy to install and remove. You can then use the rings to tie stuff down (that is, pass your loop from the tail rack through the rings to secure your bag on the rear seat).

Secret Compartment

The compartment on the bottom side of the seat in the pillion area is a great place to store the owner's manual, other papers, and the rubber funnel. Add a zip-lock bag to put the funnel in after use.

RKA

The RKA sport bag and the RKA radio bag has been used on the K12 with great success.

Mod Top Case

One owner has mounted a modified RT top case to the luggage rack.

What's that Smell

This applies only to the earlier system-cases, as the new cases, coming out in 2000, should not be affected.

Some reported burnt left saddlebags with one actually going into flames. I don't have a good handle on this problem, but the left bag should clear the muffler by about 1 inch. One observer reported that bags with more heat tape seem not to have this problem. I don't know the difference between less and more at this time. There is some concern that putting too much weight in the left bag causes it to bend downward, something I have not observed. Reportedly a homemade support rod extending between both bags can keep the left bag away from the muffler.

DON'T LET THE BIKE IDLE FOR LONG PERIODS WITH THE BAGS ON, ESPECIALLY IN HOT WEATHER.

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Repairs and Maintenance

Fairing Removal and Attachment

Not all of the bolts are of the same type or length. Make a drawing of the fairing and place the bolts on it where they belong. Also, when attaching the fairing, don't over tighten the bolts. The fairing plastic is soft and will compress and crack with firm pressure. If you're worried about the bolts working out, put a little Shoo-Goo on each bolt before inserting. One application will last for many attachments.

Peg Pads

The front peg pads, especially the left one, will wear before the back ones. To get longer life from the pads, switch the left and right peg and then fore to aft. A metal strip, with two nuts welded to it, is contained in the pads. Unscrew both bolts before removing. Avoid bending the metal strip.

Shop Manual

The official BMW shop manual is out. $110 mail order.

Low Speed and Standing Drops

Damage can range from minimal to several thousand dollars. With the saddlebags on there is often very little damage. One fellow had his drop over when parked on soft ground. Over $3,000 worth of damage resulted. The red bikes require a clear coat over the base coat. BASF paint is used (OEM). The European color code for the Marrakech Red is 733 (found on the rear fender under the seat).

New Color

Cost of repainting the entire bike in a custom color is about $ 1,800 (in 1998) at Holt BMW in Athens, Ohio (a dealership that specializes in painting and does outstanding work). The paints that change color with different lighting cost more.

Squeeze Play

Don't squeeze that brake lever or push the brake pedal. That is if you removed the wheels. A way to prevent disaster is to put a piece of wood in-between the brake pads. Then, even if someone tries to activate a brake, you are protected.

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Lighting, Electrical, Batteries

Heated Hand Grips

Don't put anything inside the bar ends. There are exposed wires for the heated grips.

Hypnotic Lights

It may just be me, but I find the flashing Hyperlites distracting. I've followed bikes with them and found myself not paying attention to the brake light or turn signals.On the other hand, they may be very effective when stopped to keep cars at bay.

Light Leverage

Many riders are unaware that there is a headlight adjustment lever. This may be used when riding two up.

Burn Out

If your low beam head light bulb burns out, you can use the high beam without causing problems for oncoming drivers. Push the head light adjuster lever down to the lower position.

Hyperlites

One owner has mounted the lights on the small side reflectors of the back fender. Wires run under the fender. Good visibility reported in this position.

Driving Lights

Mount under the oil cooler cowling, on the lower forks or under the turn signal pods. Site depends on size of lights and available brackets.

Get the Euro switch cluster for no charge when you add heated grips [part # 61 31 2 305 771]). The switch may be used to control the driving lights. It allows for three switch settings with one usable as an off position.

Rear Running Light

A BMW auxiliary running light plate is available. This goes behind the license plate and adds two red, round, running lights, each about 2" in diameter. The plate is black and unobtrusive.

Osram

http://www.osram.de/

Light Labor

Change all bulbs when you need to replace one of the headlight bulbs if you use the shop manual procedure (indicates extensive disassembly)

It is apparently possible to change bulbs without taking off the fairing.

Head Lamp Cover Up

Replacement of headlight lenses requires purchase of the entire assembly at a cost of about $250. You may want a protective cover.

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Custom

Detailing Decals

Decals and extra mirrors may be applied over vinyl tape for easy removal later.

Custom Ideas

Customizing has included painting the entire exhaust canister black (powder coat technique), application of checker board decals to a red bike, painting the wind screen to match the body color, and covering the rear swing arm pivot holes.

Heel Problems

Does your left heel touch the top of the side stand lever? This becomes more of a problem if peg-lowering plates are installed. One owner removed the rubber cap and cut off 1/2 inch.

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Mirrors

Adjustment

Mirrors should be adjusted to give a view of what's behind you and to a lesser extent what's beside you. The head check should be used for the blind spot.

Convex Swivel

Convex swivel mirrors are available and can be mounted on the turn signal pods or topsides of the windscreen. Try Sport Touring Accessories at 1 800 889-5550 for the type with a stalk.

Off set convex swivel mirrors are also available at some automotive departments. These correct for the angle of the mounting surface on the backs of the turn signal pods.

Attachment can be reversible. Take the covering material/paper off of the adhesive pads on the mirrors. Place slippery side up on a flat surface. Then cover with black vinyl tape. Cut the tape off around the covering material/paper. Then attach to the adhesive pad on the back of the mirror (the pad goes against the nonadhesive side of the vinyl tape). Peel off the covering material and apply to the turn signal pod. The vinyl tape can be peeled off of the pod without leaving behind part of the adhesive pad.

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Handling and Performance

ABS and Washboard

Braking on a washboard road surface may confuse the ABS and this may result in poor handling/braking.

Gravel

Progressive oscillation occurs in loosely packed gravel with the K12RS (personal experience). Try less pressure on the bars and more weight on the pegs. Some recommend standing on the pegs.

Head-Shake

This may be due to certain front-end geometries and weight distributions. (A similar phenomenon occurs on some bicycles. My Schwinn used to do this when coasting down hill. It would stop when my weight was moved back on the saddle or I started peddling.) A progressive oscillation is characteristic and occurs while coasting with little bar input and when riding in loosely packed gravel. It can be separated from out-of-balance tires. The latter causes a non-progressive shake. However, if a bike has susceptible front-end geometry, a combination of the two may exist and separating things out may be difficult. The progressive oscillation is sometimes associated with certain tire types.

Headshake of the progressive oscillation type does not appear to be a problem on the K12RS.

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Exhaust Systems

Silicone Muffler Protection

Apply before and after trips (catch the muffler while it's still hot after a trip for best results). My aluminum looks better and better.

Removing the Stock Cover

See: http://www.ibmwr.org/ktech/k12rs-heat-shield.shtml

See IBMWR K-Tech page.

Removal and replacement is not recommended unless there is significant damage to the existing cover.

Wudo Voodoo

Wudo sells a stainless steel muffler cover for $257. A polished muffler tip is also available.

Cleaning

Try Mother's Aluminum Polish. This also spiffs up the stainless steel exhaust components.

Warranty Replacement Muffler

This is stainless steel with a black tip.

After Market

See IBMWR K-Tech page.

The current Staintune sport and touring systems (about $1300), consist of a number of slip-together components. These have oxygen sensors, but not catalytic converters. Poor idling and backfiring with deceleration reported with the sport system. Modified systems are rumored to be in the works.

The Remus has a single slip fitting and costs less than the Staintune ($689). Sport and touring systems are available. Reported to sound totally cool and deep throated. No catalytic converter - - four into a collector box/pre-muffler and then into a single exhaust pipe. The cost is slightly over $1,000.

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Brakes

ABS Faulting

If the ABS lights indicate a fault, that is alternate flashing of the two lights, it may be due to incorrect gap size between the ABS sensor and the ABS rotor on the wheels. The needed gauge is in the tool kit. Damaged teeth on the ABS rotor will also cause the fault light function to activate.

Brake Wear

My back brake pads were replaced at 18,000 miles due to wear.

Adjustable Ergos

All points on the brake system are adjustable on the K12RS.

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Cleaning

Glass Wax

A silicon lubricant will clean, preserve, polish, and protect many of the non-painted surfaces. This includes the windscreen and the aluminum muffler cover. Water now beads on the muffler cover and the windscreen looks brand new.

Air Flow

Wash, wax, and polish in the direction that air moves over the bike. Don't use circular motions as this results in cobwebs.

Kiwi

I recommend Kiwi liquid wax for care of the paint.

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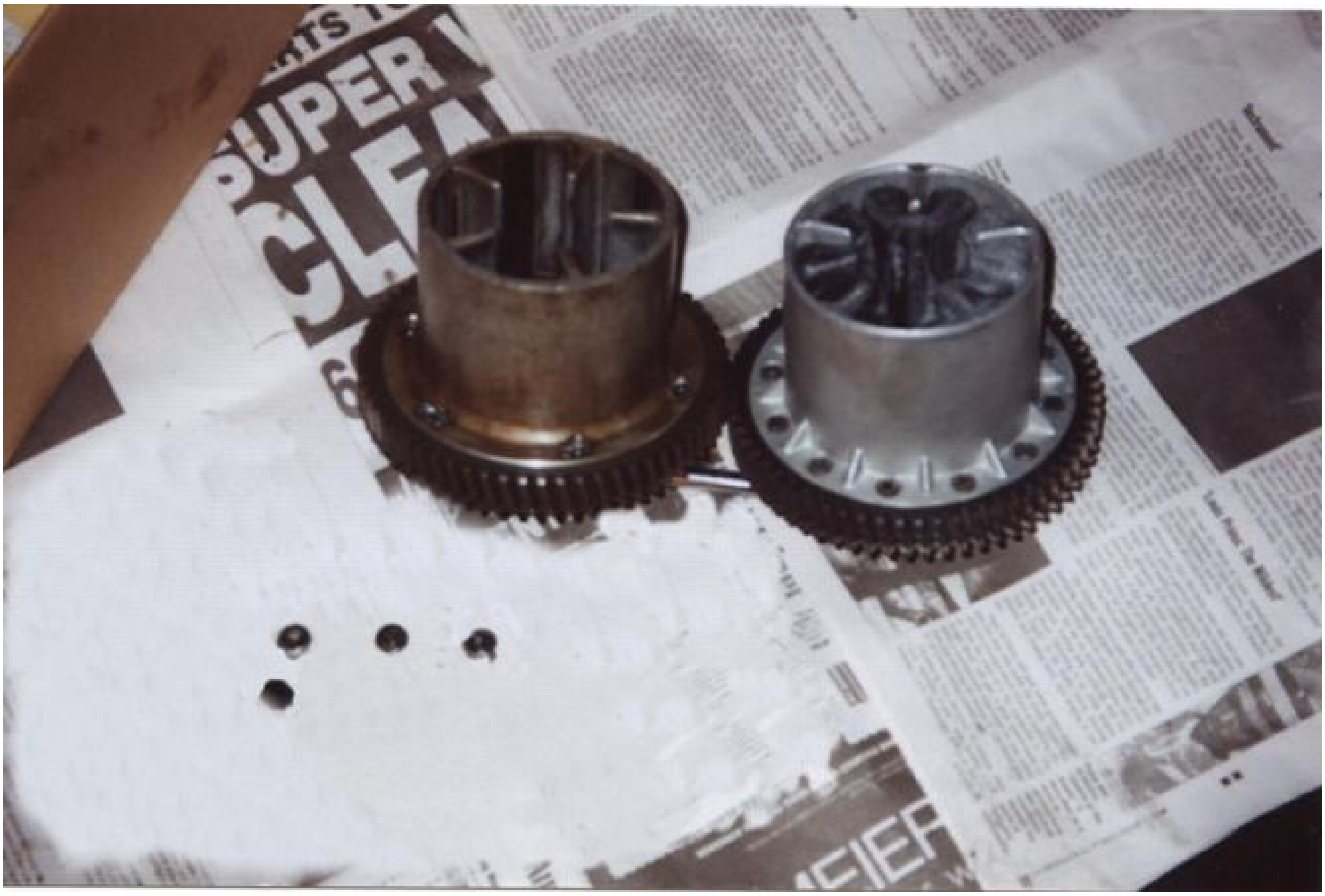
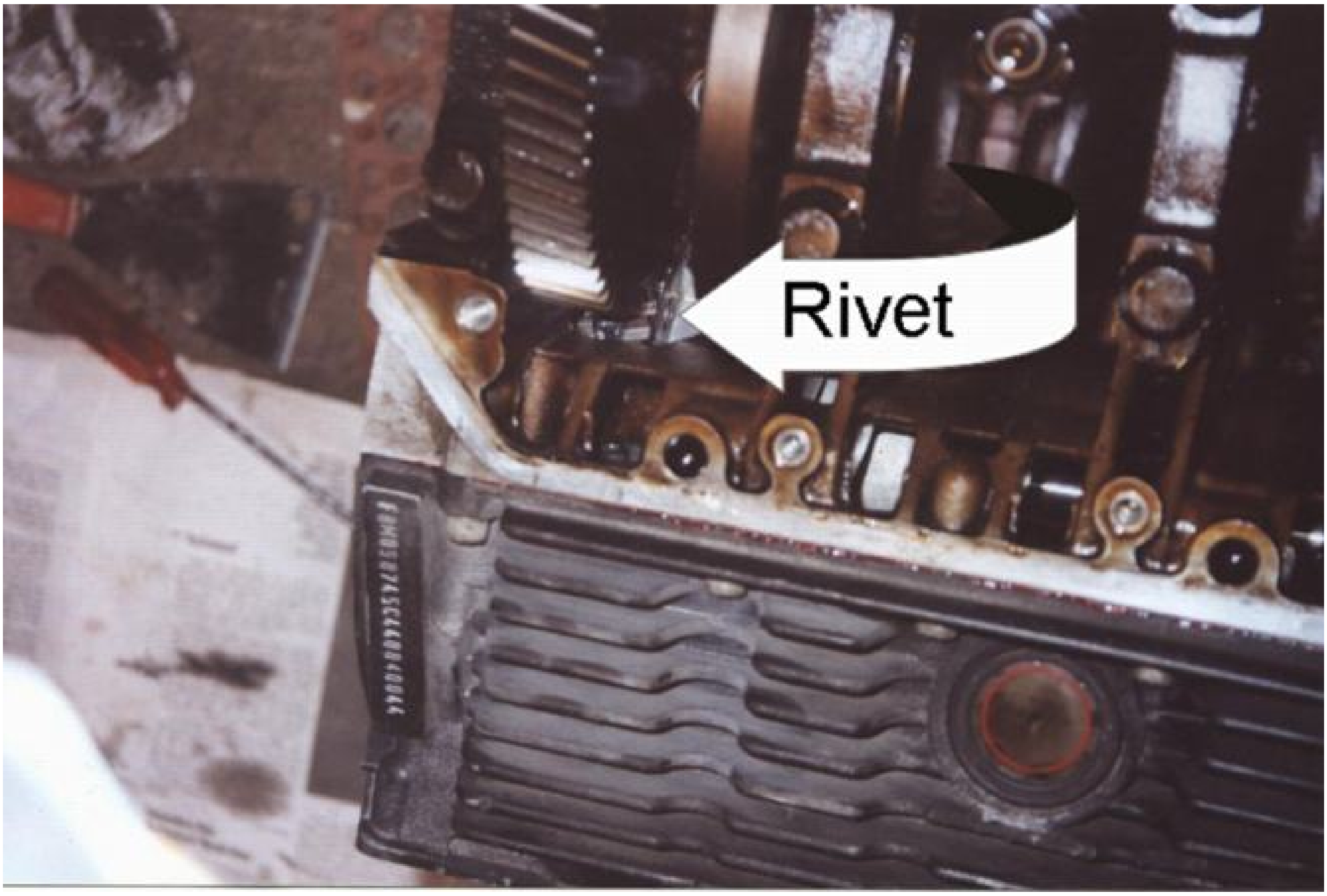



Rivet

K Bike Water/Oil Pump Rebuild Using New-Style Seals

By Don Forsman
Original Article May 2003

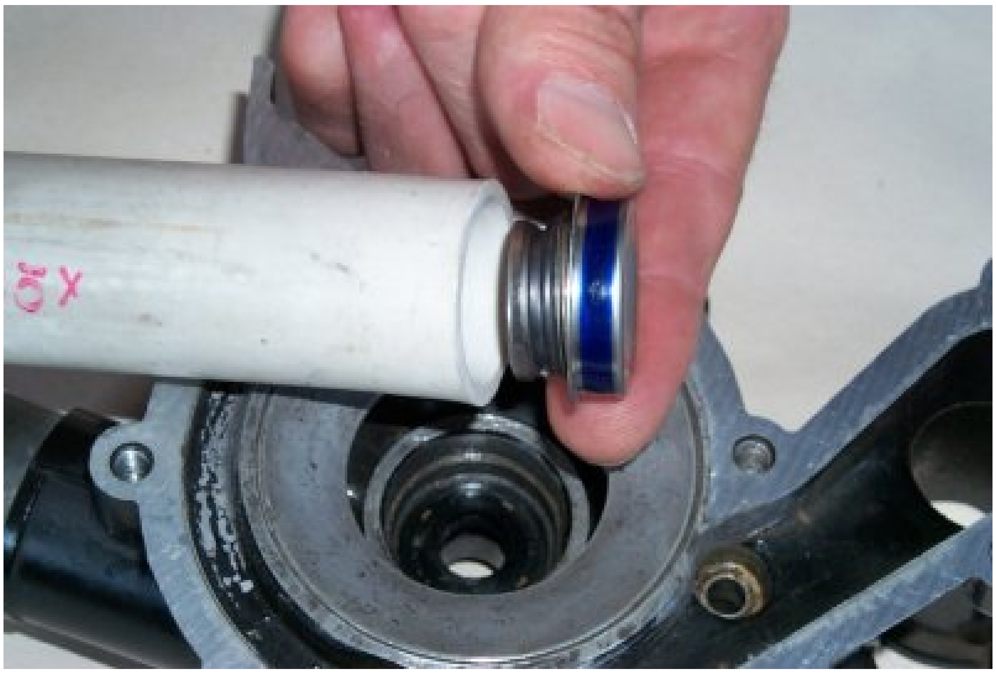
[*Due to a design change in the seal for the water pump, it was time to revise a portion of the original rebuild tech procedure. Thanks to Don Forsman, IBMWR now has pictures and a step-by-step procedure to install this new part. Thanks Don! - Jon Diaz*]

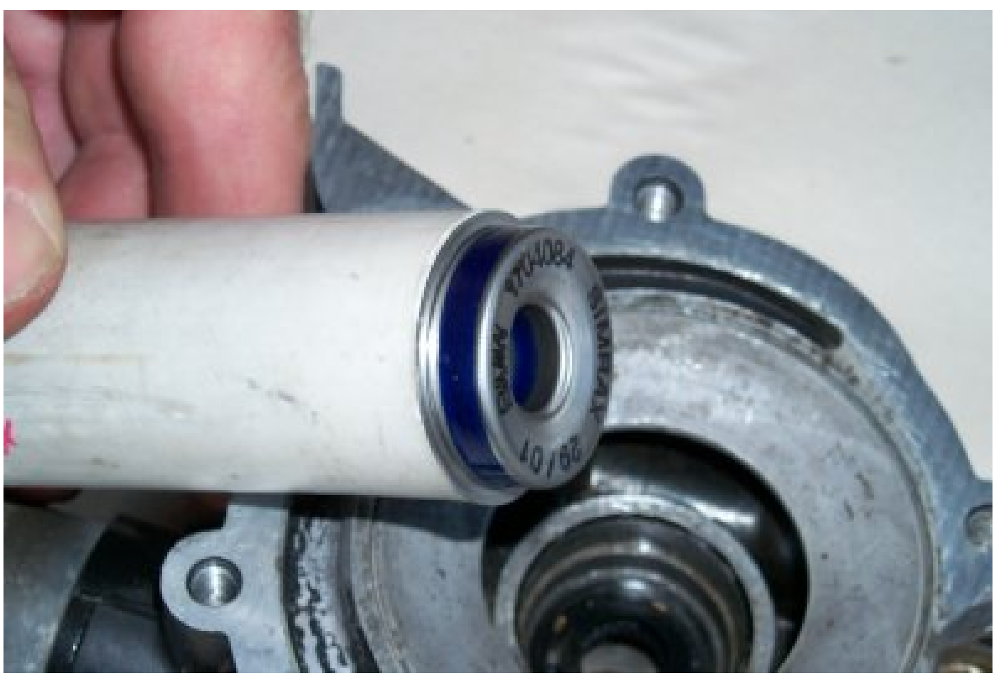
This article is considered an addendum to the original tech procedure, and assumes that you have already begun the reassembly process, and have installed your oil seal. Here is a picture of the oil and water seals.

Photo courtesy of Clif Lines

You can think of the water seal as consisting of two parts: the inner part and the outer part. The outer part is that part that is pressed into the water pump housing and remains stationary when the engine is running. The inner part is the part that turns with the shaft and impeller. You will be putting the outer part into the housing and then putting the shaft through the inner part from the back or oil side. This must be done carefully or you will be buying more than one seal to get this job done.

Now, you will need a "special tool" to press the water seal into the housing. I used a piece of PVC pipe which I chamfered on the inside to just fit over the seal and bear on the seal lip.





Make sure the pipe you use has a large enough inside diameter to pass over the inner part of the seal and not put any force on it. The blue "goo" on the outer part is the sealant. There is more blue goo on the inside of the inner part that you are going to have to deal with shortly. I then drove it home using a rubber mallet on the end of the PVC.

Here is the installed water seal.

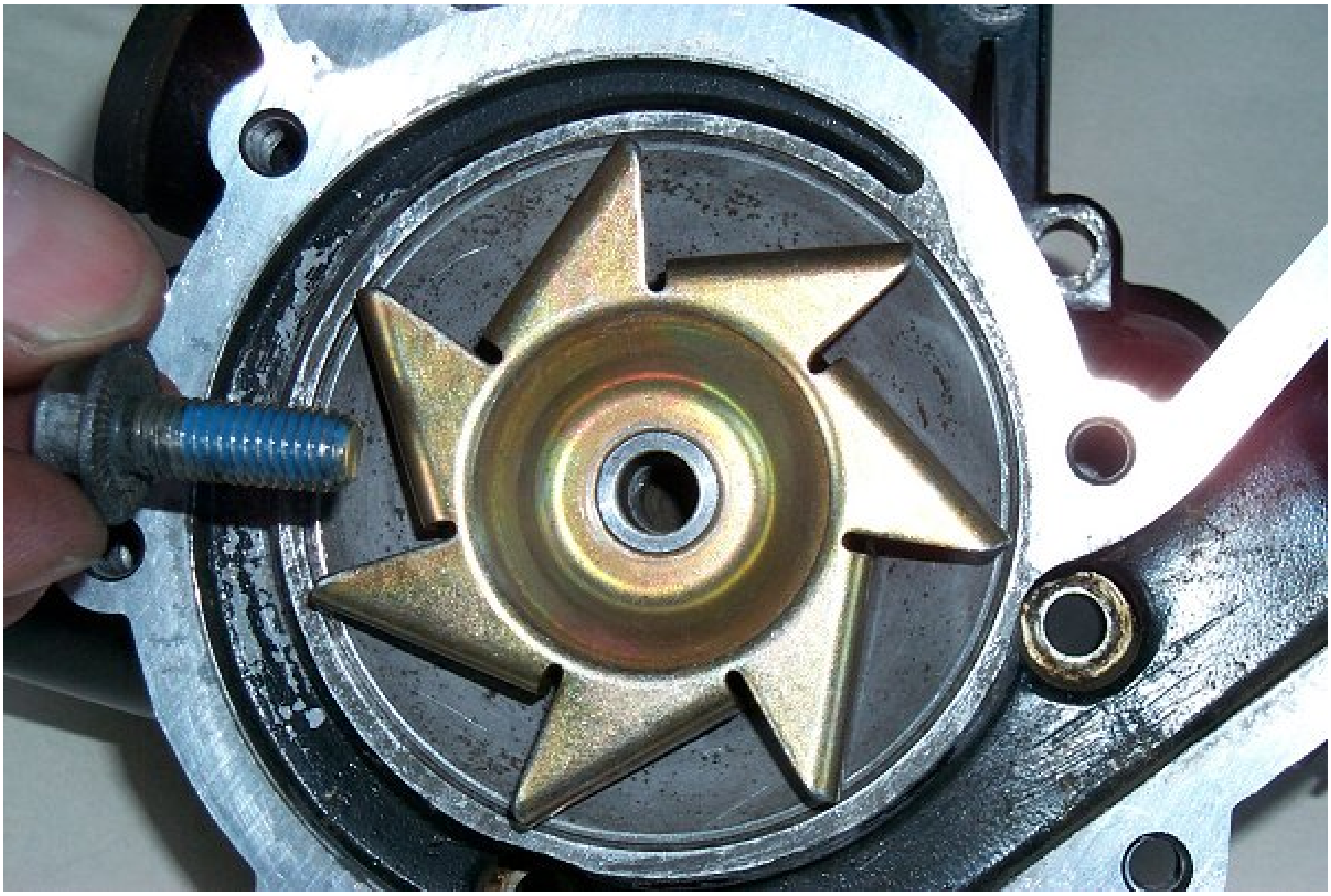
Now that you have the outer part of the seal properly seated in the housing, take the shaft with the gear on the back side and *carefully* insert it from the back or oil side of the housing, through the oil seal you just installed and then up through the inner part of the water seal ONLY UNTIL IT REACHES THE BLUE GOO. Then STOP!!! If you keep pushing you will destroy the seal.

Now, take the bolt that held the impellor to the shaft. Get some washers that will fit it. You are going to take that bolt and washers and use it to pull the shaft up through the blue goo in the inner part of the seal. (the next pic shows the bolt, washer, and shaft end right at the inner blue goo) The washers will be pushing on the surface of the inner part of the seal so it cannot be forced out by the shaft as it comes up through it. You may have to hold on to the gear on the back side of the shaft as you tighten the bolt to keep things from turning. I think I used a small piece of hardwood to jam it. (JD: the oil pump side of the shaft should have an opening for an allen wrench, although juggling all of it is a three-handed job.)

When you get the shaft to the front of the inner seal, stop and remove the bolt and washer. Now take the spacer that came with the new impellor and use it instead of the washer to draw the shaft through that last little bit. The spacer is recessed and the shaft should go into it.

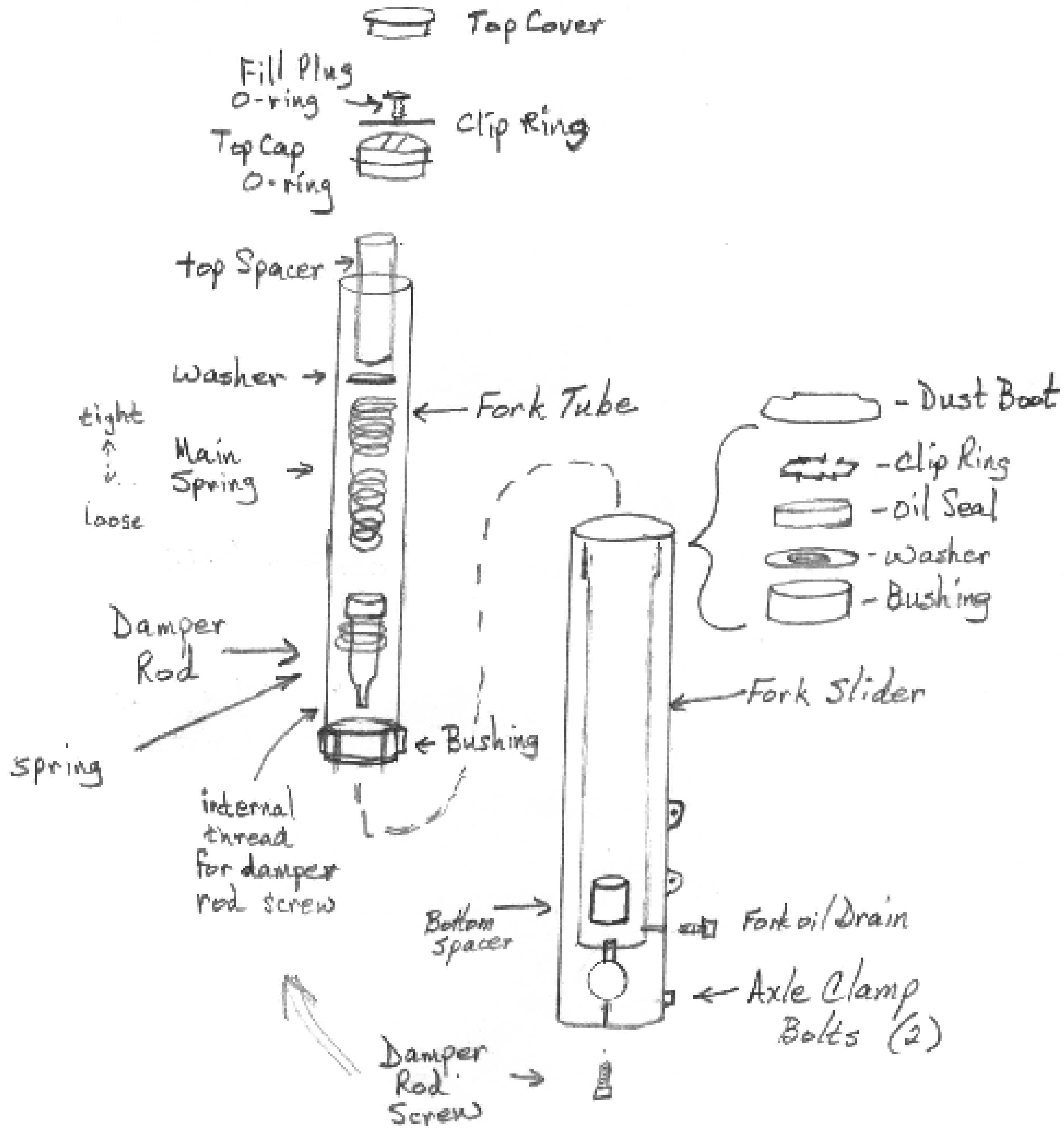
Check the back side where the gear is. Is the gear against the housing or is it standing out a little? You might wish to continue pulling the shaft just a little bit more, using another washer, to get rid of that extra space. I did that and found that the impellor spacer on the front was no longer in contact with the inner part of the seal. But, the spacer does not act as a seal (the blue goo does) and it, the shaft, and the impellor are all spinning together. And, the space was only the thickness of the washer. I only worried about it until I went out riding. It hasn't leaked yet.

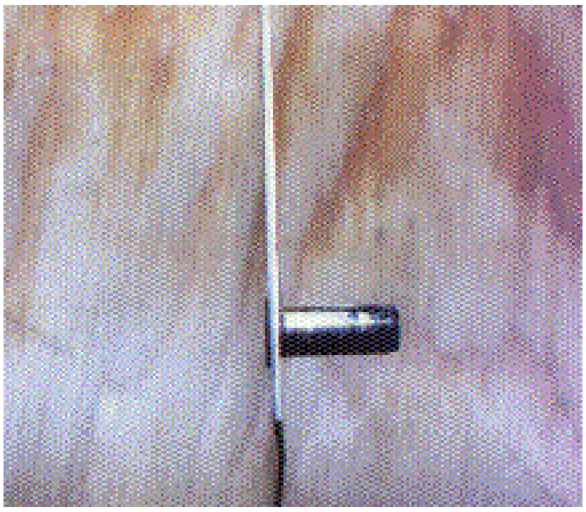
I put the spacer and impellor back on and bolted it back down using blue loc-tite on the bolt.

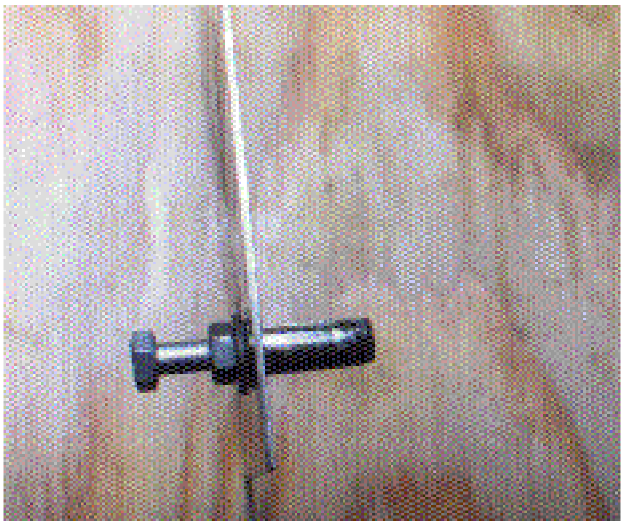


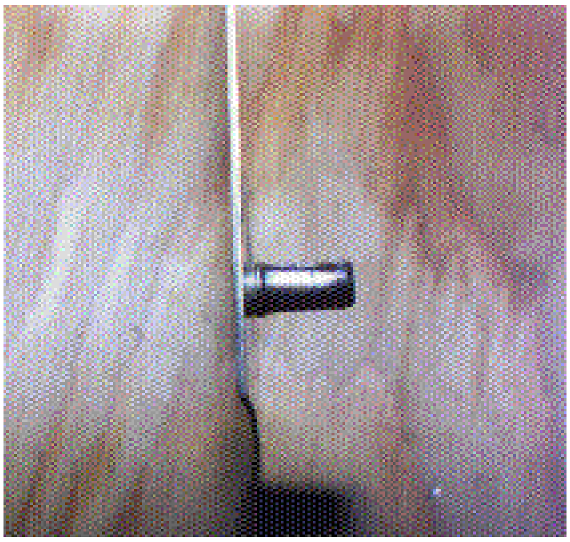
One other thing I did was replace two of the long bolts with stainless ones. Those were the long bolts that hold the housing to the engine block, not the shorter ones that hold the outer cover to the housing. The long bolts I took out were so badly corroded that the hex socket ends were enlarged and required an SAE allen wrench to remove them.

Now you may follow the rest of the previous tech article for completion of the reinstallation process.

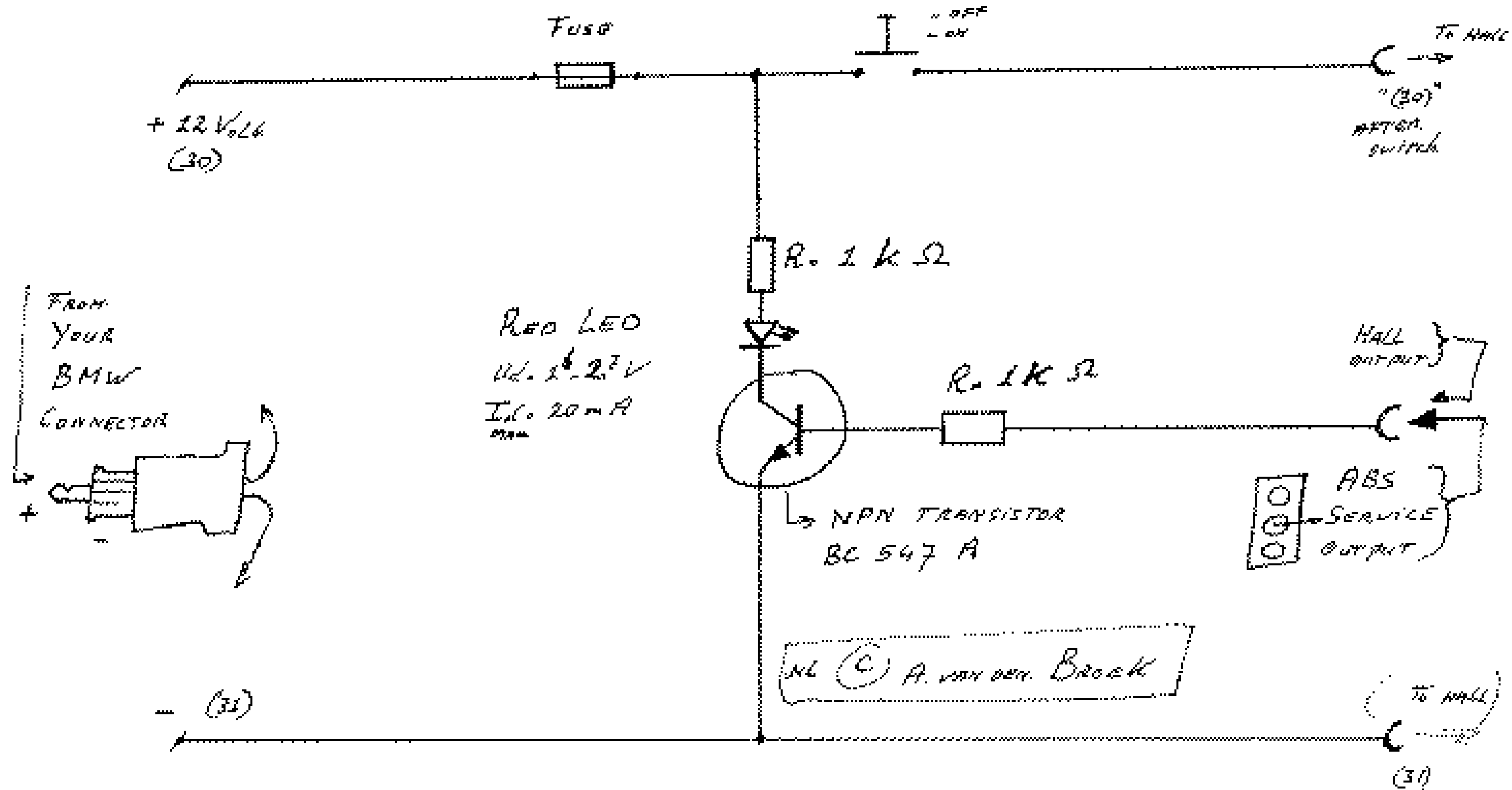

Top Cover
Fill Plug
O-ring
Clip Ring
Top Cap
O-ring
top Spacer
Washer
Fork Tube
tight
loose
Main Spring
Dust Boot
Clip Ring
Oil Seal
Washer
Bushing
Damper Rod
Spring
Fork Slider
Bushing
internal thread for damper rod screw
Bottom Spacer
Fork oil Drain
Axle Clamp Bolts (2)
Damper Rod Screw







ABS - Fault code - Flashing diode - Test box - Self made



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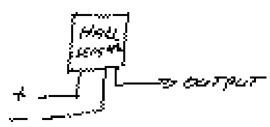
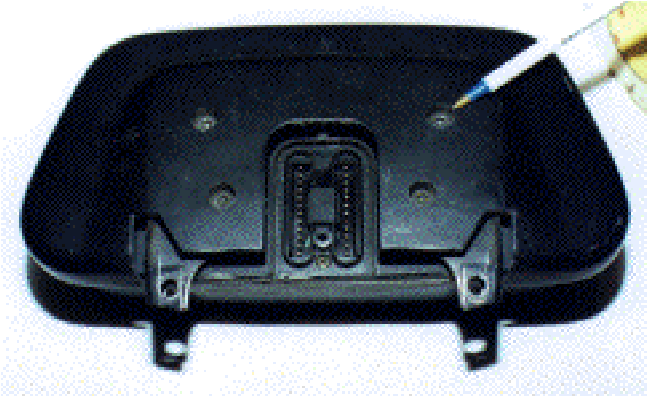
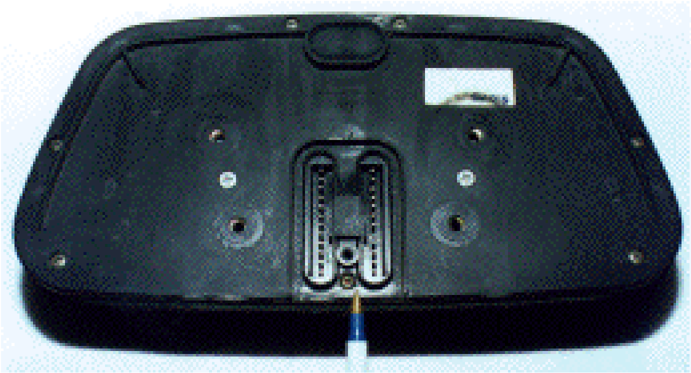
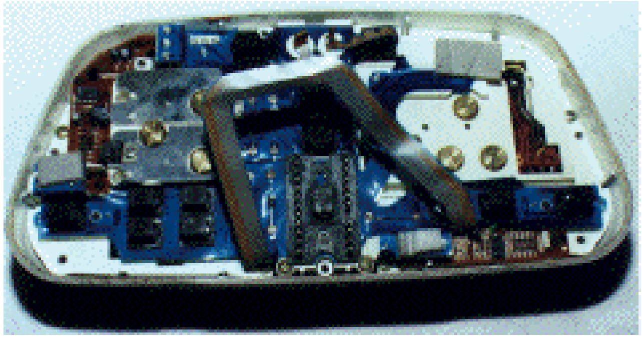
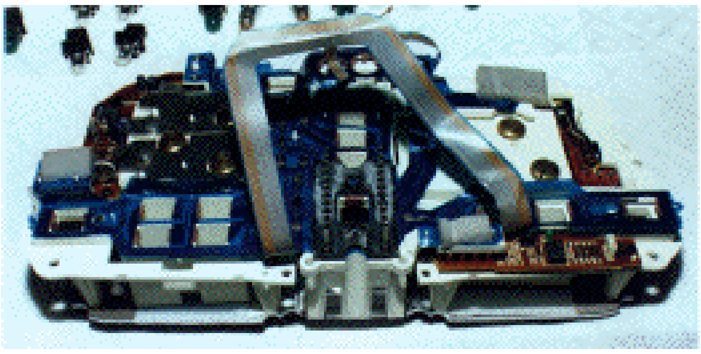
For wire numbers zie BMW or other Diagrams
As describe in the Clymer Book

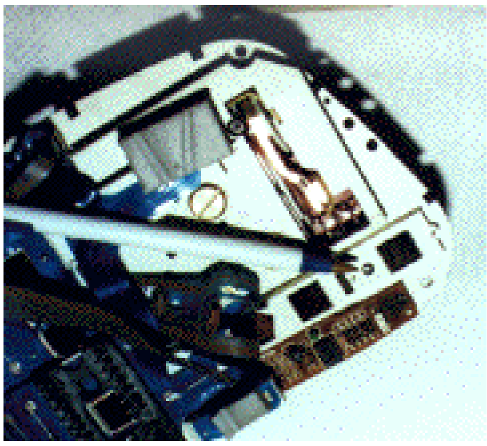


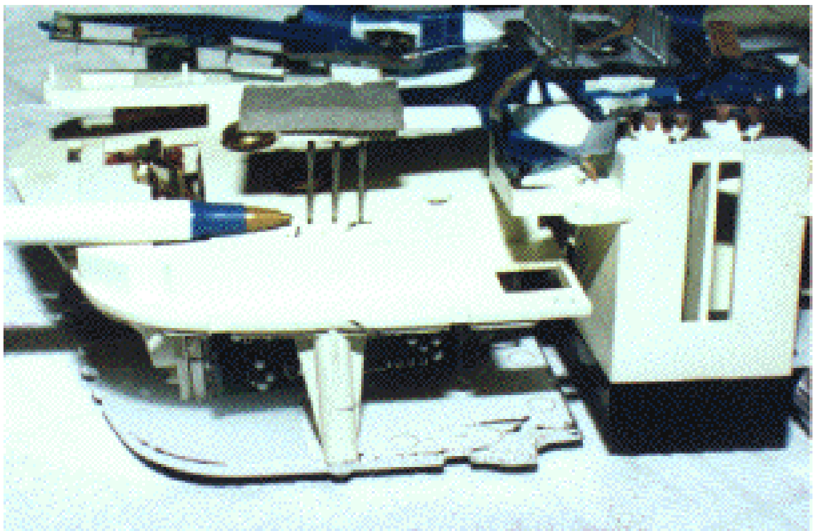












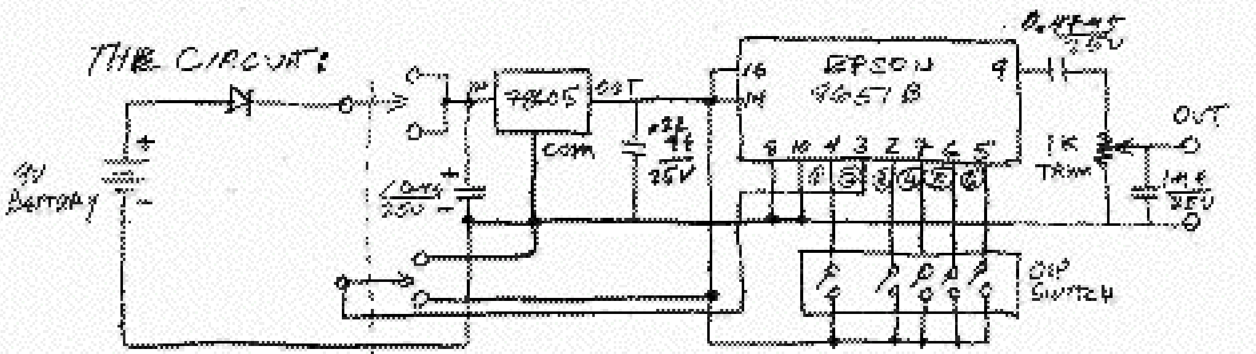
THE OBSERVED # OF PULSES TO THE ODOMETER IS 75 PULSES/MILE

THE SP8800 CHIP IS WIRED TO DIVIDE BY 64

SO THE INPUT # OF PULSES/MILE FROM THE REAR WHEEL IS 64×75 P/MILE $= 4800 \frac{\text{PULSES}}{\text{MILE}}$

THEN $4800 \frac{\text{PULSES}}{\text{MILE}} \times \frac{1\text{ HOUR}}{3600\text{ SEC}} = 1.333 \frac{\text{PULSES/SEC}}{\text{MILES/HOUR}}$

THE CIRCUIT:



MOM SWITCH CENTER OFF ↑ 100 P/SEC ↓ 50 P/SEC

(WITH DIP SWITCH SET TO 0 X 0 0 1 1)

DIP SWITCH FREQ DATA

(DIP SWITCH: CLOSED = 1 OPEN = 0)

①	②	③	④	⑤	⑥	
0	1	1	0	1	1	33.3 P/SEC
0	1	0	0	1	1	50 P/SEC
0	0	0	0	1	1	100 P/SEC
1	1	0	0	1	0	166.6 P/SEC

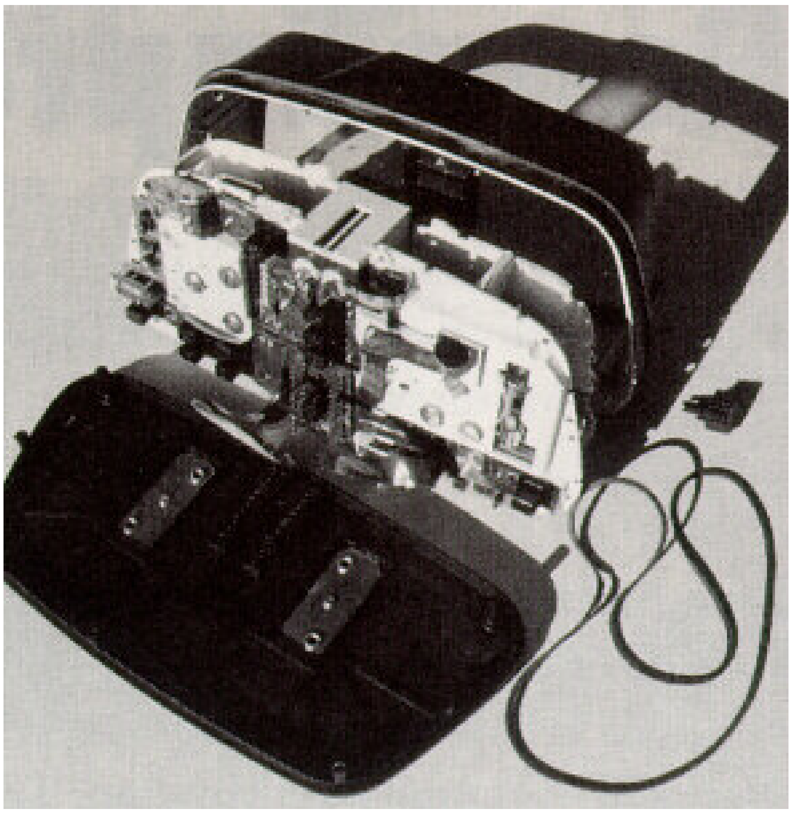
THESE FREQ'S ARE THE MOST USEFUL AVAILABLE FROM THIS CHIP.

$$\frac{33.3\text{ P/SEC}}{1.33 \frac{\text{P/SEC}}{\text{MPH}}} = 25\text{ MPH}$$

$$\frac{50\text{ P/SEC}}{1.33 \frac{\text{P/SEC}}{\text{MPH}}} = 37.5\text{ MPH}$$

$$\frac{100\text{ P/SEC}}{1.33 \frac{\text{P/SEC}}{\text{MPH}}} = 75\text{ MPH}$$

$$\frac{166.6\text{ P/SEC}}{1.33 \frac{\text{P/SEC}}{\text{MPH}}} = 125\text{ MPH}$$



Homemade Male Plug

The other components needed to achieve these goals were both male and female headlight plugs and a power feed wire for the relay assembly.

After considerable searching, I determined that a male version of a 3-prong headlight plug was not something available to the general public. Although I've seen them in headlight adaptors (Hella has one), I was unable to locate any place to purchase one. So.. I decided to build my own by modifying a female (readily available) headlight socket.

I made up 3 brass pieces from light gauge sheet brass (about 20 gauge), 1/4" wide x 3/4" long. I inserted these into a female headlight plug, and ended up with a male I also reversed two of the connectors in this plug - this is described in detail later in the FAQ. The homemade male plug is illustrated in the photo.

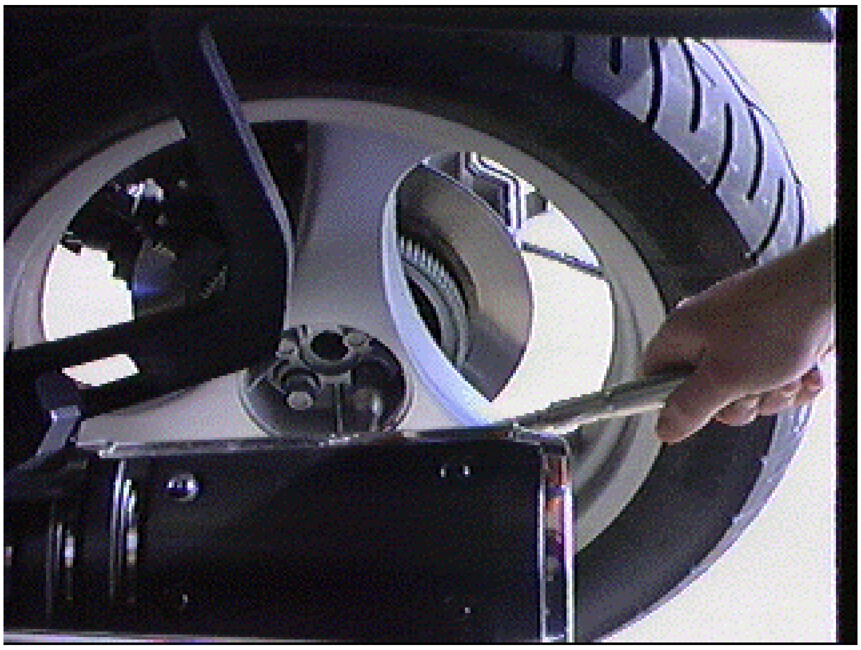
maleplug.gif

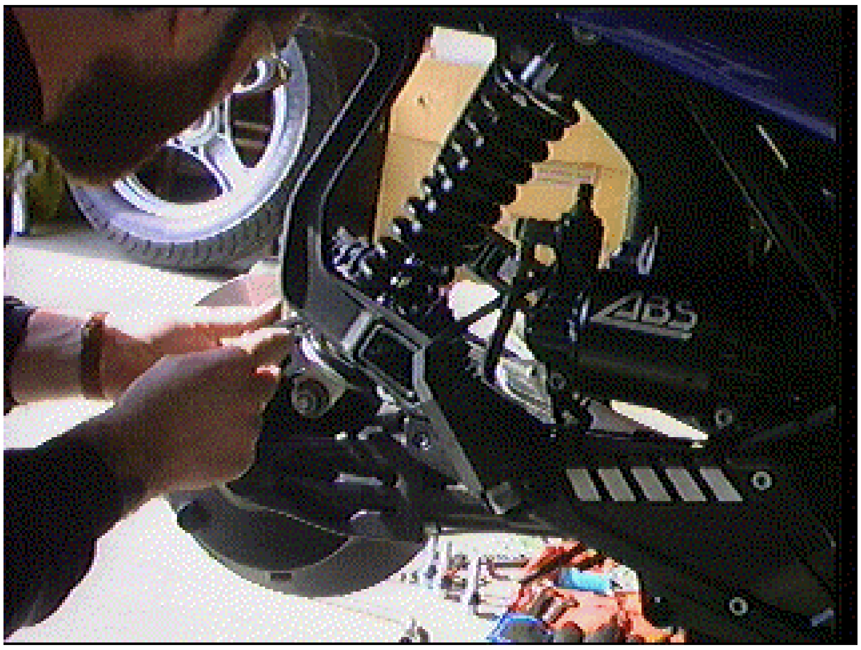
As can be seen, the plug I used was color coded. In searching for a female headlight plug, I purchased several different headlight plugs from various auto-parts stores.

What I found surprised me - many of them were not dimensionally correct to mate cleanly with a headlight or H4 bulb. The pin spacing was incorrect. The only one I found where the spacing was correct was manufactured by **Calterm**, part number **08521, "Universal Headlight Socket"**. It also had the advantage of using color coded wires, making for ease of wiring. I located it at one chain of local auto-parts stores in one of the usual rotating racks of aftermarket electronic parts.

upon first opening, you can see brush dust everywhere, it was probably this dust that was causing my bike to exhibit intermittant flat battery symptoms, like no-start and faint instrument lights, the start ccts seem to need an earth through the starter and a build up of brush dust inside can hamper this, only about an hour to remove/clean/refit for the experianced k mechanic

P8280015.jpg Posted by erice on 28/08/2001, 50KB

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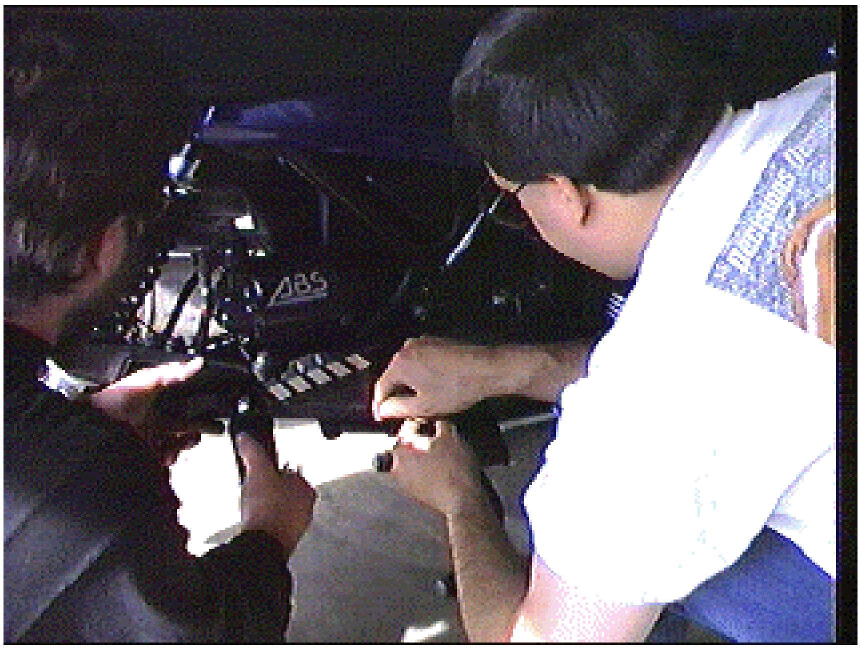
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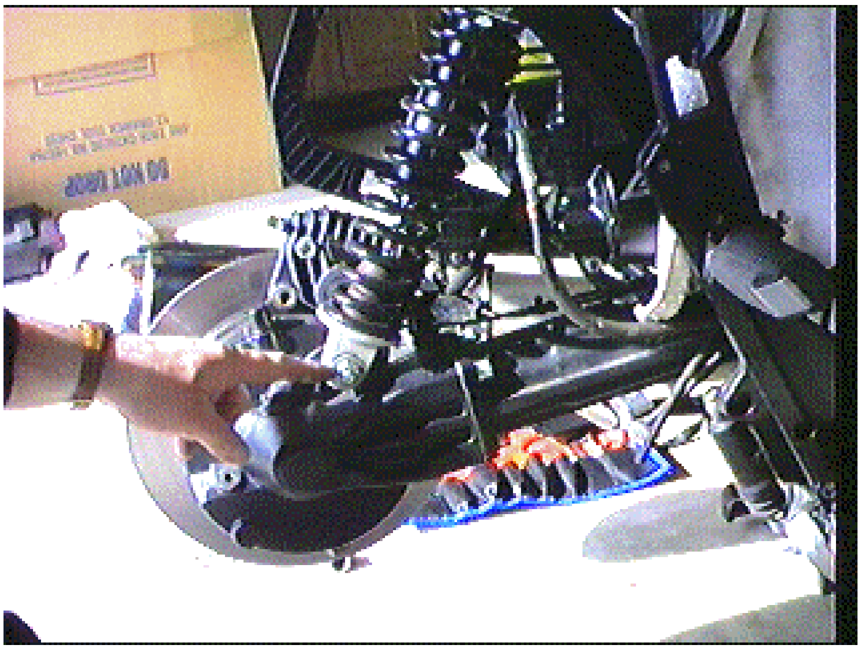
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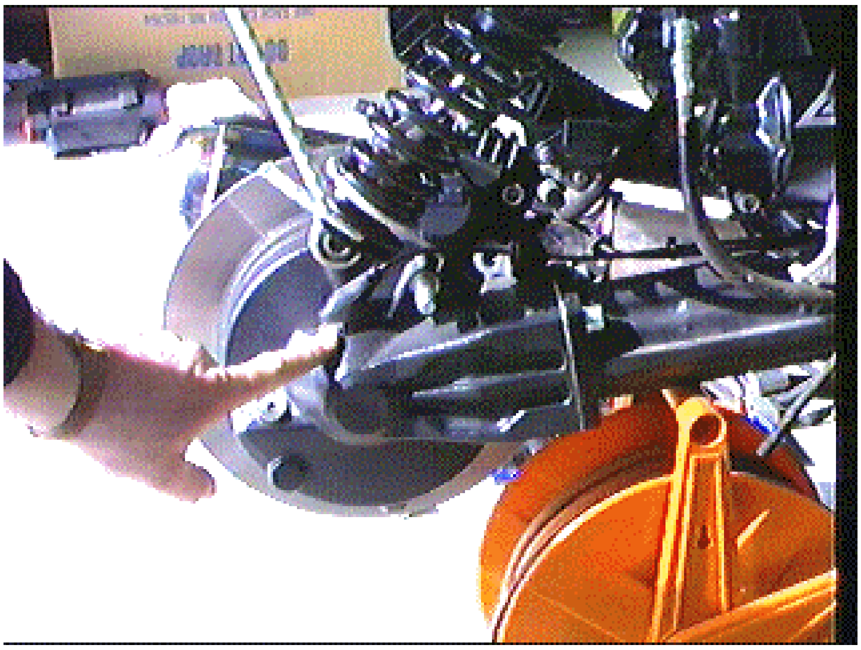
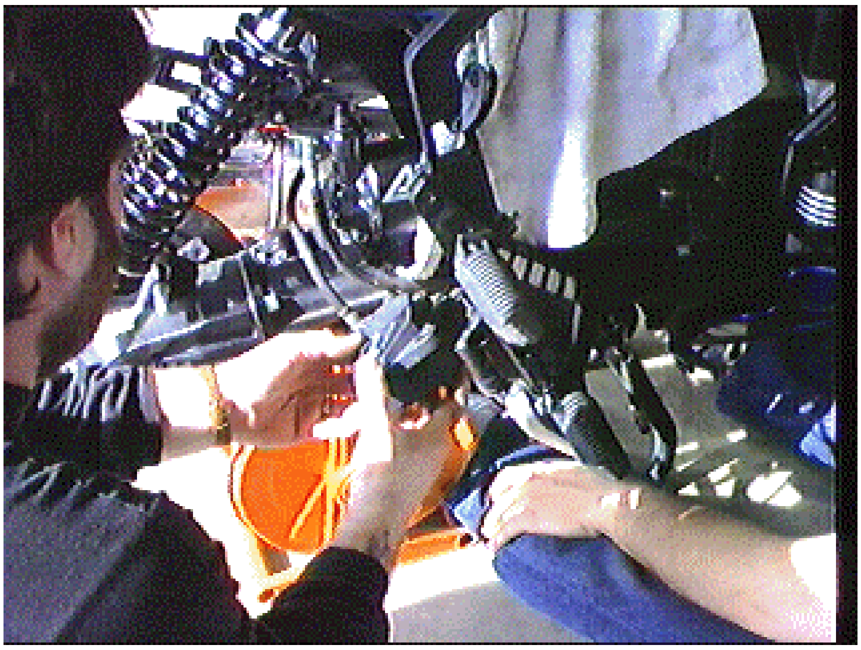
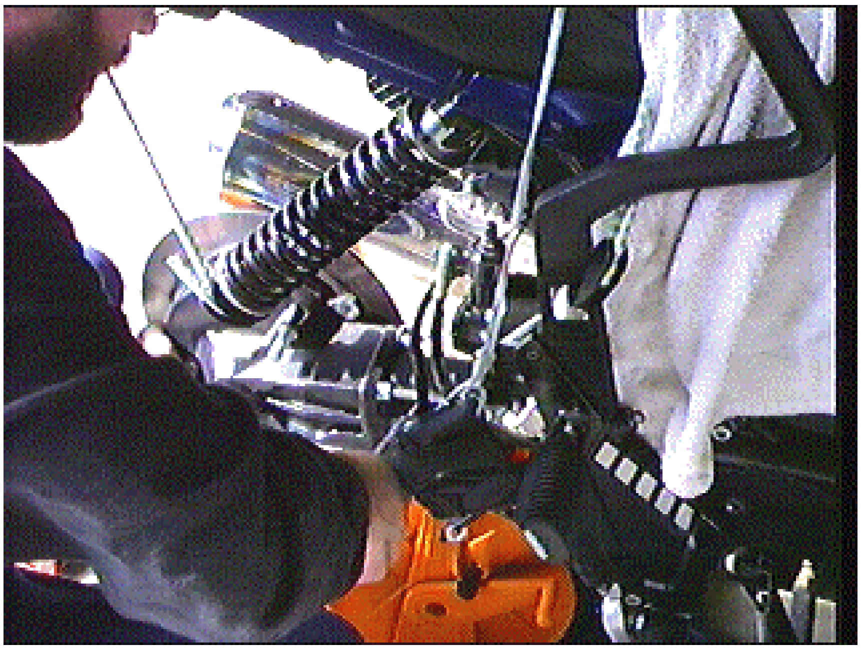
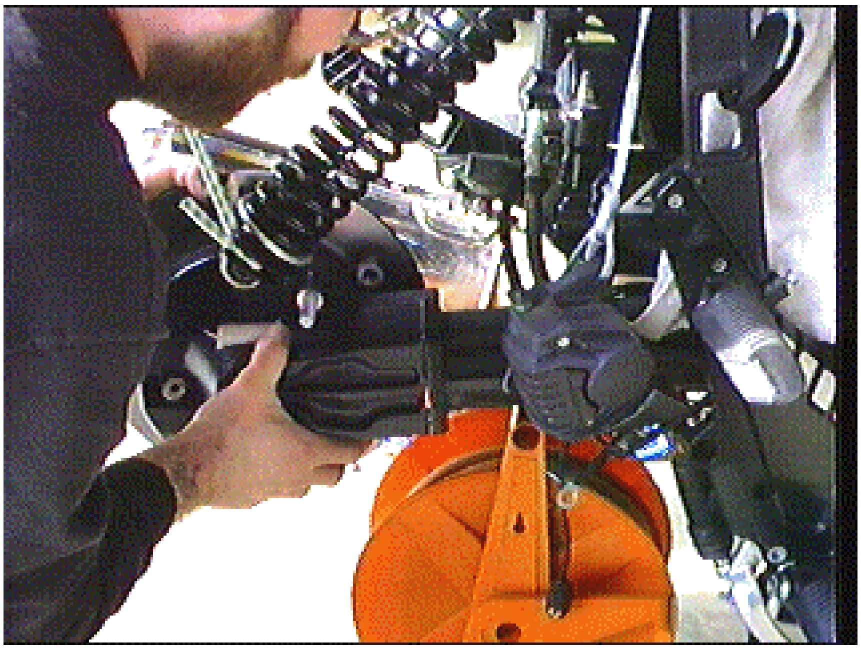
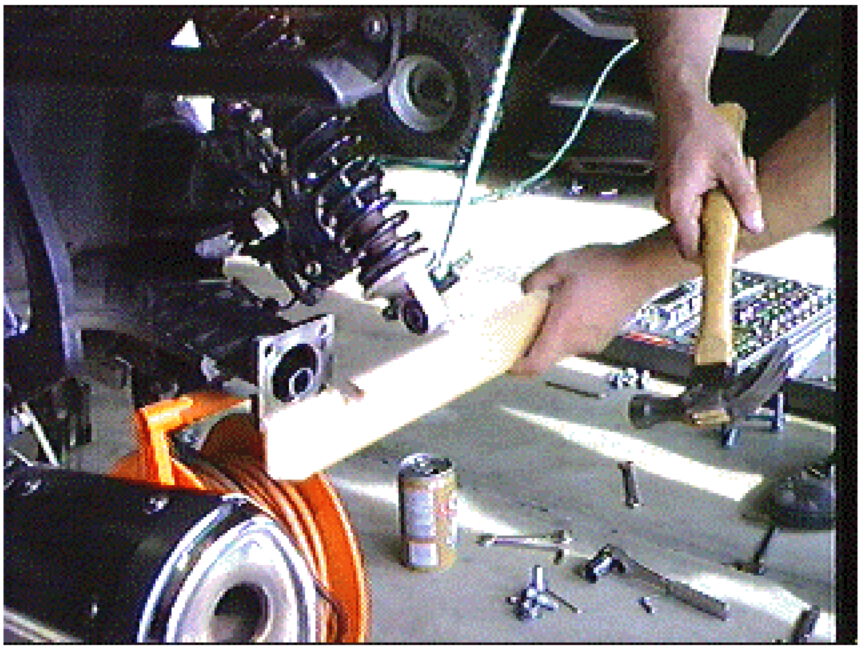


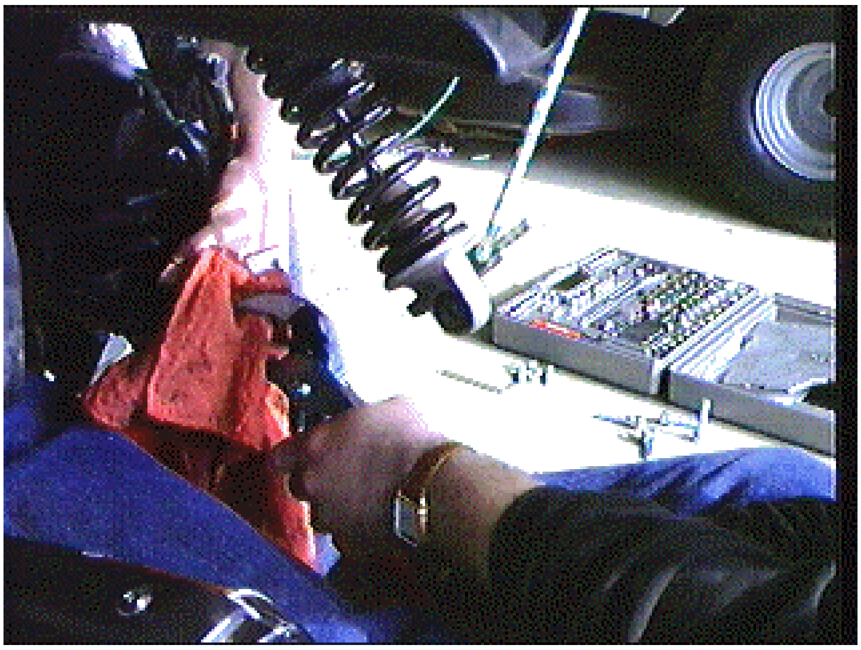


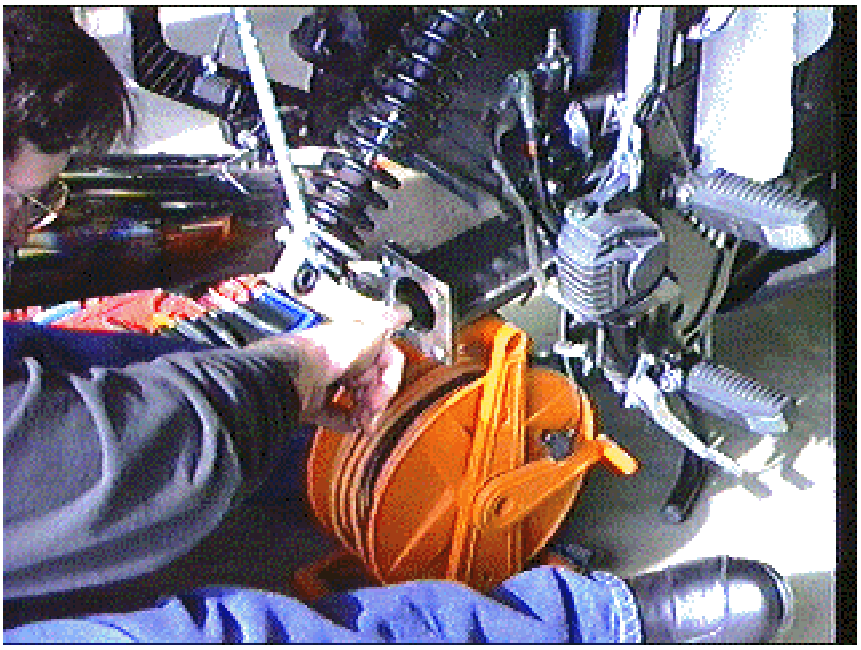


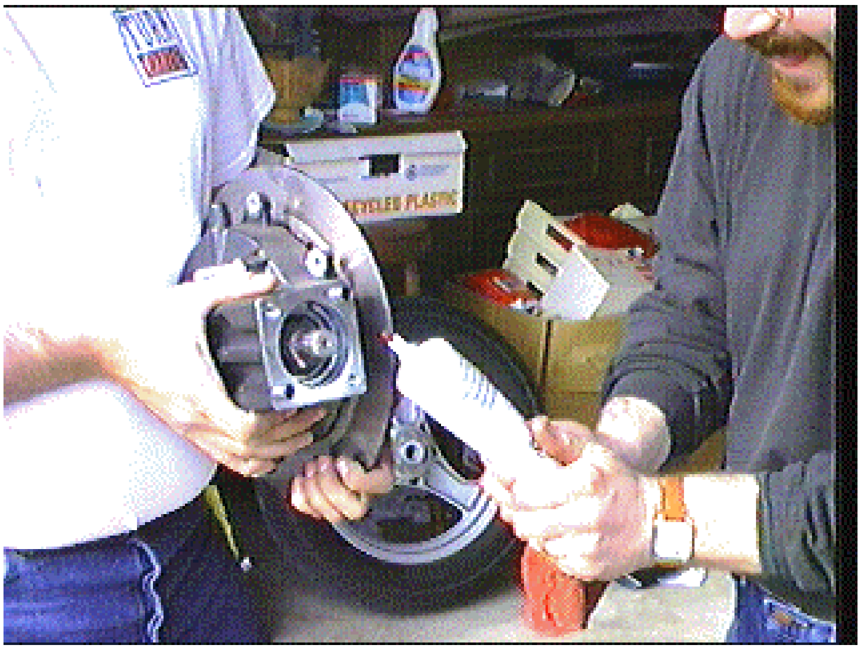


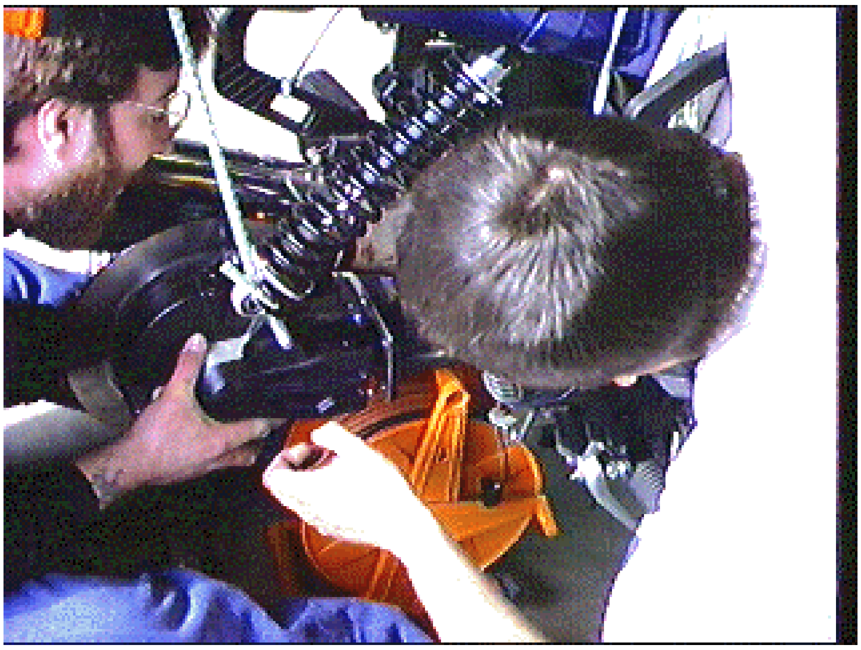

TURN
one

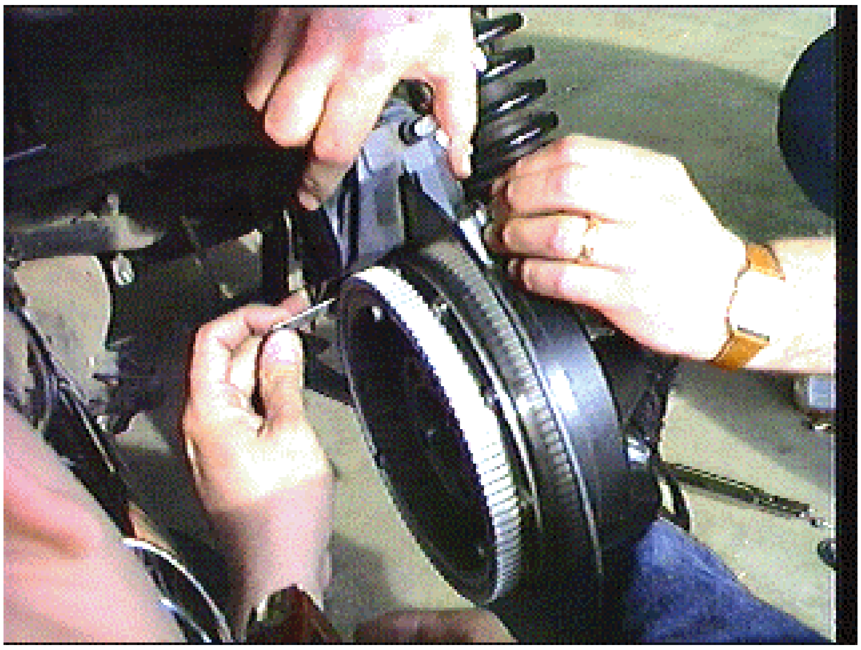


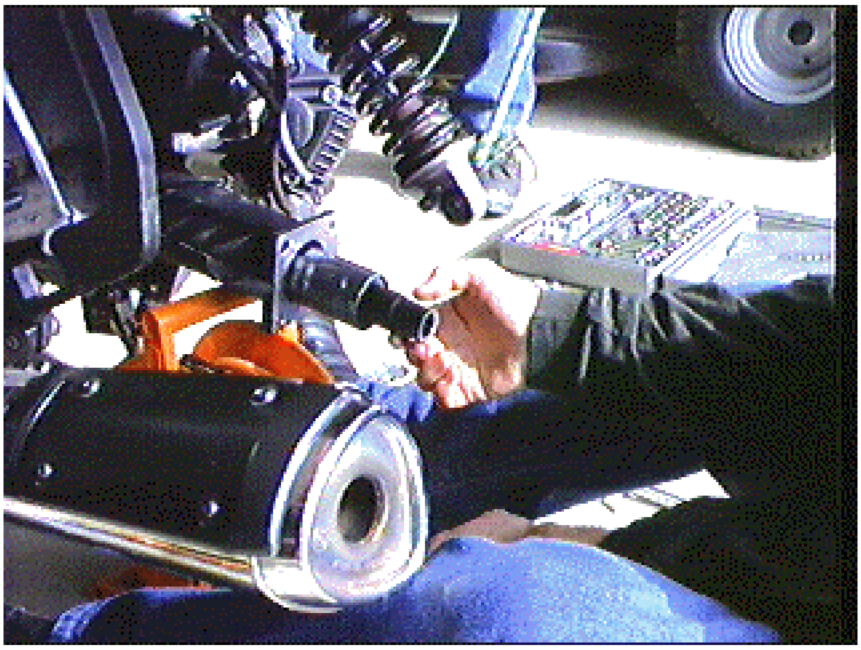


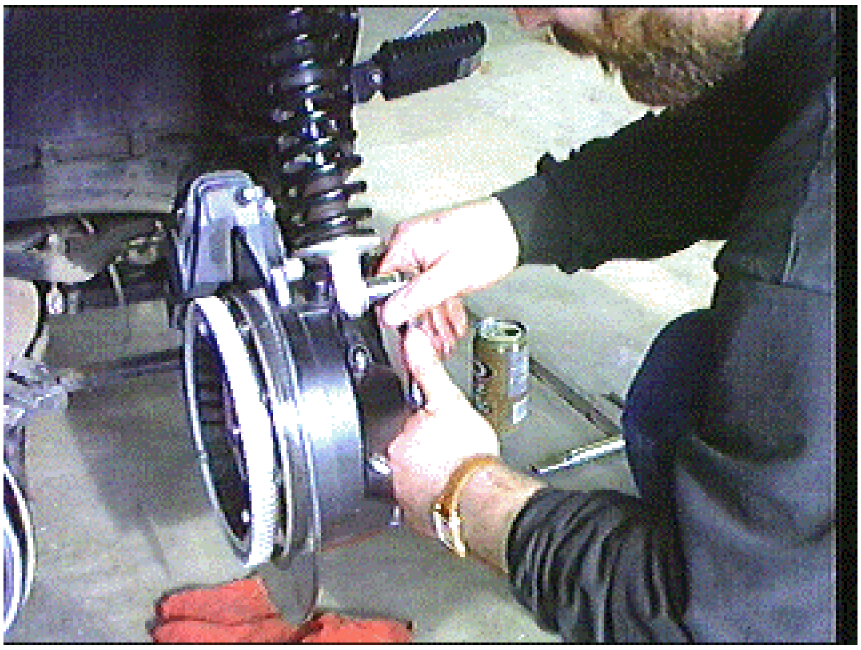


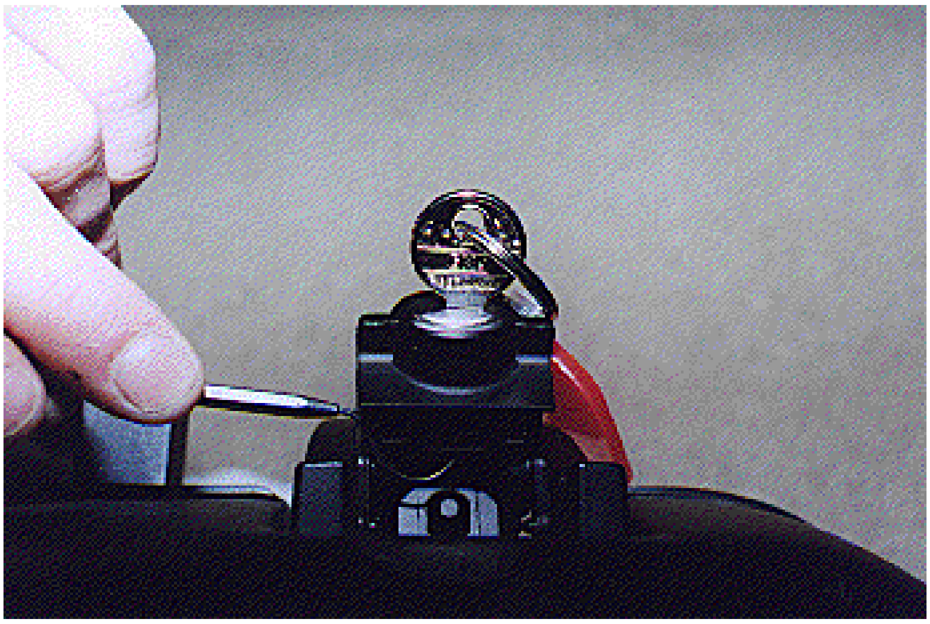


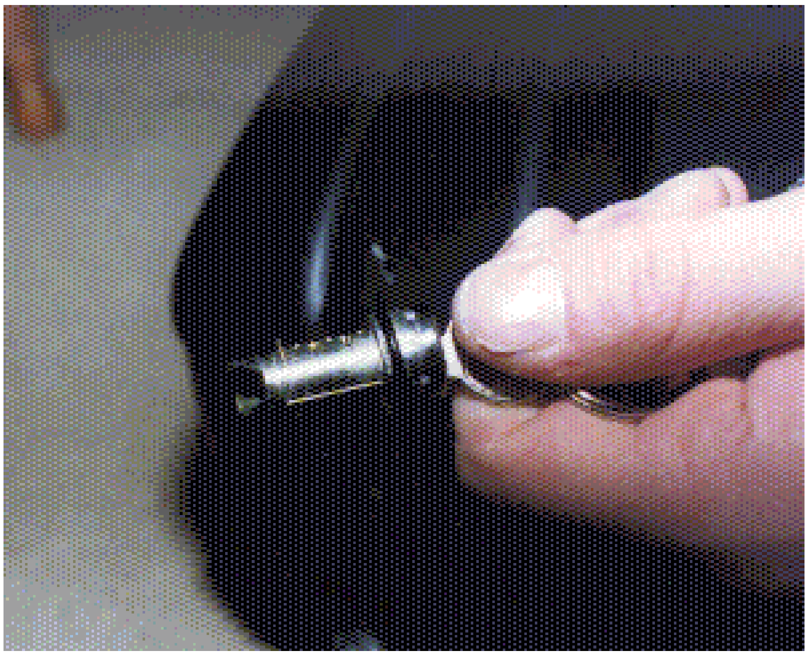


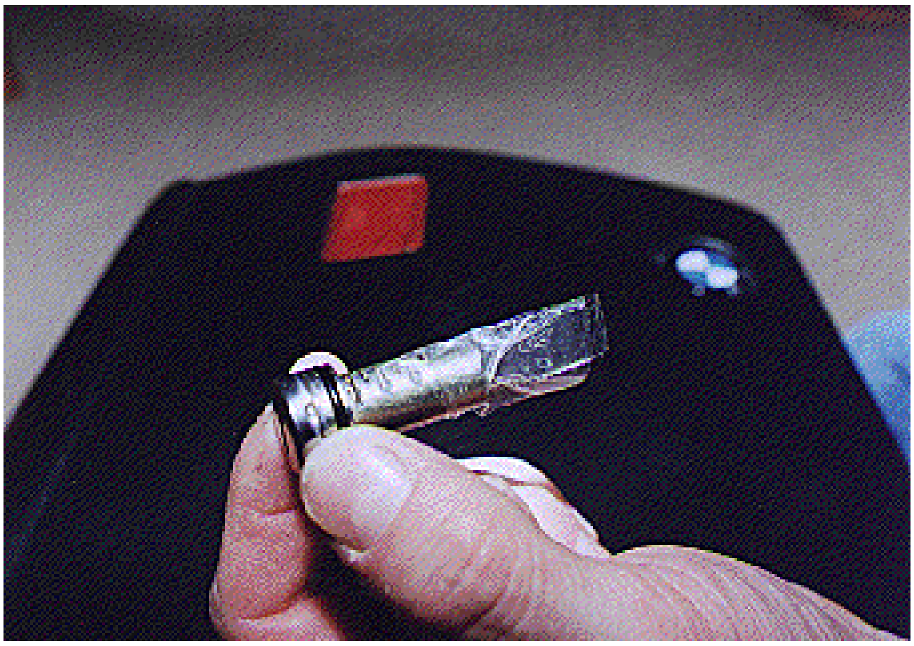












R11 Bag Lock Modification
Removing the key while unlocked

by Joe Senner

This article will (hopefully) explain how to modify the locks on your R11 bags (and topcase) so you can remove the key with the bags unlocked. I can only guess as to BMW's reason behind requiring the bags be locked to remove the key, but I am positive that it is a pain in the ass for me.

Pulling The Lock Cylinder

The R11 bag locks are much like the older style locks and require only a paperclip to remove the cylinder. with the bag unlocked & handles up there is a small hole near the slot where the locking tab comes out.

With the key in and the lock unlocked (so the key will pull the cylinder out easily), stick a paper clip in the hole and push the spring loaded tab in while pulling on the key lightly. When the lock face is out far enough to grab onto, use it to contiue pulling on since the locking tabs will eventually let go of the key as you're sliding the cylinder out. Keep reading for the appropriate warnings :)

Cylinder Handling

As long as the key is in the cylinder, everything will stay put. If you slide the key out of the now exposed cylinder all manner of small bits will go flying around the room and you'll be hard pressed to make your lock work correctly again.

Cylinder Dissasembly

To finish the job you'll have to take the whole cylinder apart so find yourself a nice clean, flat place to work. I used a shoebox on top of my workmate which had the added benifit of catching the small bits when I slipped and they went flying.

There are 7 tabs and springs in the cylinder, 6 of which do the actual locking with the last one being the tab that holds the cylinder in the bag during normal use. The locking tabs are arranged 3 per side with small springs to push them out when there's no key in the cylinder.

Each tab has a different width slot in it that the key runs through. The width of the slot and the bump on the key determine how far it will be pulled back into the cylinder. All 6 must pull back a certain distance to allow the cylinder to turn in the lock.

The Touchy Part

Holding the cylinder with thumb and forefinger on the tabs, work the key in and out of the lock and observe how the tabs move. As the key moves out you'll notice that the side of the tab opposite the spring direction is forced out of the cylinder as the key bumps its way past. The tabs that are forced out as the key is removed need to be ground down flush with the cylinder.

Note: This is how my lock worked. It may be that your lock needs to have some grinding on the spring side of the tab as well. who knows? As usual, YMMV :-)

The good news here is that if you only have to grind off the side of the tabs that are pushed away from the spring side, you won't affect the locking ability of the lock at all! In my case, only 4 of the tabs needed any grinding at all.

On to the fun part. Holding the cylinder as earlier, work the key out until you can remove the first locking tab (furthest away from the face of the lock). When you pull it out you'll see the small spring buried down in the little hole. With the tab out, shake, dig, or pry the little spring out (carefully of course) and set the pair down on your work surface.

KEEP THE TABS IN ODER!

Repeat the process until all of the tabs are laid out nicely, kind of like this.

Sorry about the poor quality of that picture, there wasn't much light and I had trouble getting close enough to get any detail without screwing up the focus.

The Reassembly Process

Reinstall just the first spring and tab. Holding it flush with the cylinder body with a finger, insert the key slowly and watch to see if the tab is forced out in either direction. If it is, not how much and which side, and grind the tab down at that spot. When you can insert the key and it looks like the tab doesn't extend out of the cylinder, this tab is probably done.

With the key in the lock, insert the cylinder back in the bag to make sure you've got the clearance right. If you look closely at the lock holder, you'll see a sloped grove cut in one part of the lock. This grove will push the tab into the cylinder as you turn it, so set the tab against the to of the grove and turn it as you push lightly. The tab will push into the cylinder and the whole mess will slide into the lock. Make sure the slot in the end of the cylinder looks like it will line up with the tang down inside the lock so things will go together all the way.

With the cylinder reinstalled and turning to the right positions, hold the lock in with a finger on the face (remember the retaining tab isn't back in yet) and try to pull the key out from both the locked and unlocked positions. If it slides out freely, you're done with this tab. If not, you'll need to grind down the tab a little more.

With things working smoothly for this tab, remove the cylinder and then the tab and put it back on the table in it's assigned spot. The cylinder will take some jiggling to get out now since the key won't be holding on to it any more!

Repeat this process for each tab until you've gotten through all 6. You'll want to do one tab at a time so you don't have to fiddle with holding more than one tab in place while you test the lock. With all tabs trimmed down you can put them all back in including the locking tab and reinstall the whole thing back in the bag.

Post Assembly Ritual

Now that you've finished the modifications (and repeated for all the other bags) it's time to drag a lawn chair out to the garage, open a cold brew and sit back and look at your accomplishment with pride :)

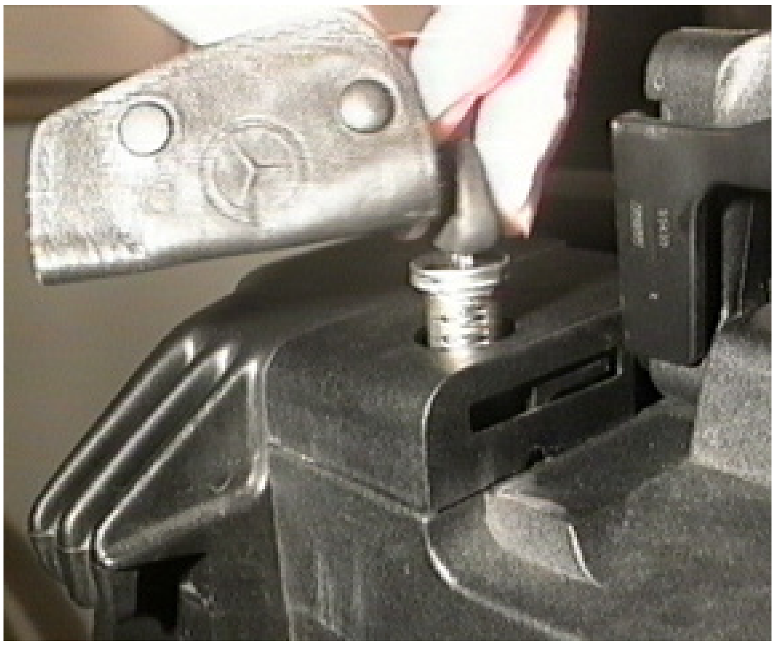
I recently rekeyed the system cases for my R1100RS to match my ignition key

By Butch Hays, President, IBMWR

Special thanks to Junji Yoshida for his help in locating four #3 tumblers.
As it turned out, he needed #1's, so we swapped ...
I take great pride in knowing that my bike now
has parts from the esteemed doctor's RS in Kashiwa, Japan.

This is a closeup view of a couple of the flat tumblers that fit inside the lock cylinder.
Not the round things, silly! Those are shown for scale

To remove the locking cylinder, insert the bag's key and turn as shown above.
Insert a paperclip into the small hole
and depress the locking tab that holds the cylinder in the lock.
Be patient with the paperclip, and exert light lifting pressure
on the key. When the locking tab is pushed in properly,
the cylinder will slide out as shown in the next photo.



As long as the key remains in the cylinder, the flat tumblers
and springs will stay where they belong ...
DO NOT REMOVE THE KEY until you are ready to hold the tumblers
in the cylinder with your fingers. It's also a good idea to work on a
clean table with a clean shop towel to catch the small springs and tabs
(flat tumblers) as you remove them.

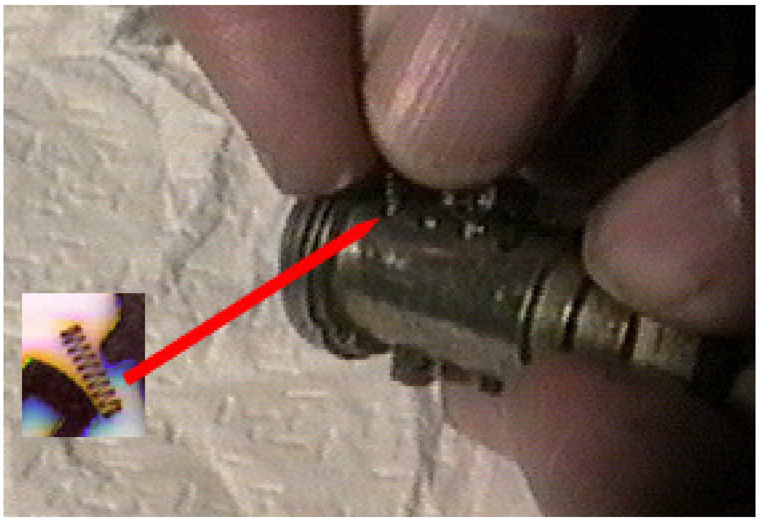
The photo above shows the cylinder (key out) with the tabs ready to be removed.
To rekey the lock you must insert the ignition key in the cylinder and note the tumblers
that extend out from the cylinder. These are the ones you need to
rearrange. Note their position, remove the key and then remove the
offending tab (one at a time). If you are lucky, you may be able to rekey
your lock by simply rearranging the tabs that you have. I had a couple
of #1 tabs that needed to be replaced with #3's.

NOTE: You can always operate your locks with fewer than 6 tumblers,
or you can file down #1's and #2's to make them fit. I was able to find
a fellow IBMWR President who had #3's and needed #1's.

Re-keying the Saddlebags -- End of the Story (LONG)
by: Yoshida, Junji

I've been told that most BMW motorcycle dealerships have a bin of spare tumblers
that they use to rekey their customer's bags. I've also been told that BMW cages

use the same locks so you should be able to get them there as well.

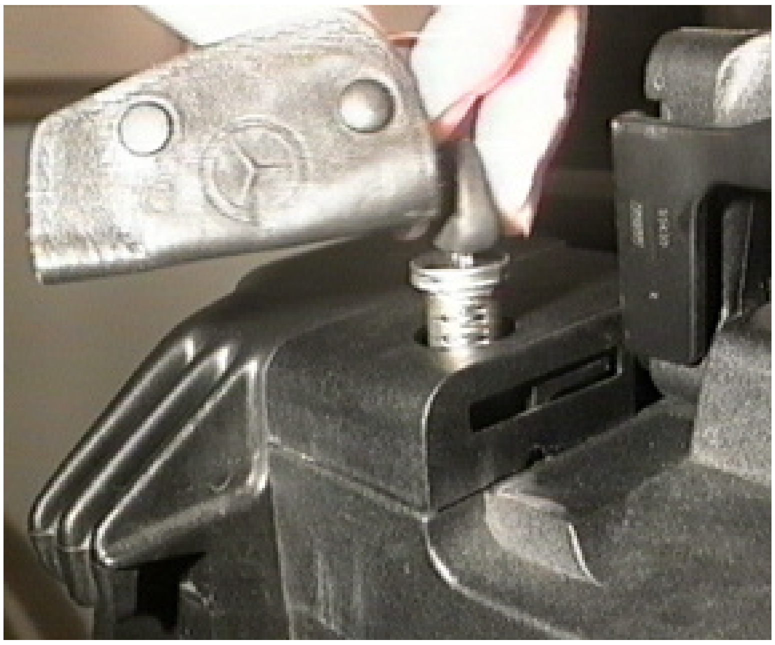


The *SPRINGS* are tiny, and easily misplaced. Treat them with care.
My lock was covered with a clear, light grease that tended to hold the springs in their tunnels.
You need one spring for each tumbler that you choose to use in your cylinder.

The locking tabs (flat tumblers) are inserted as shown. Each has a small hook that compresses its corresponding spring.

Your rekeyed lock cylinder should look like this with the ignition key inserted.

All tabs should be flush with the cylinder's surface, except for the bottom one which holds the cylinder in the bag.



Replace the cylinder with the bottom locking tab pointed toward the bike.
Press down lightly and turn 90 degrees counterclockwise.
The cylinder should slide into place with a click.
You're finished! No more having to fiddle with two keys!

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Calibration runs: We did several runs when the bike was first put on the dyno. The run below - Run007 was determined to be the 'average' of these runs. The runs we used did not vary by more than instrument accuracy (less than 1HP) at engine speeds > 5.5 k, and less than 1.5HP below 5.5 k.

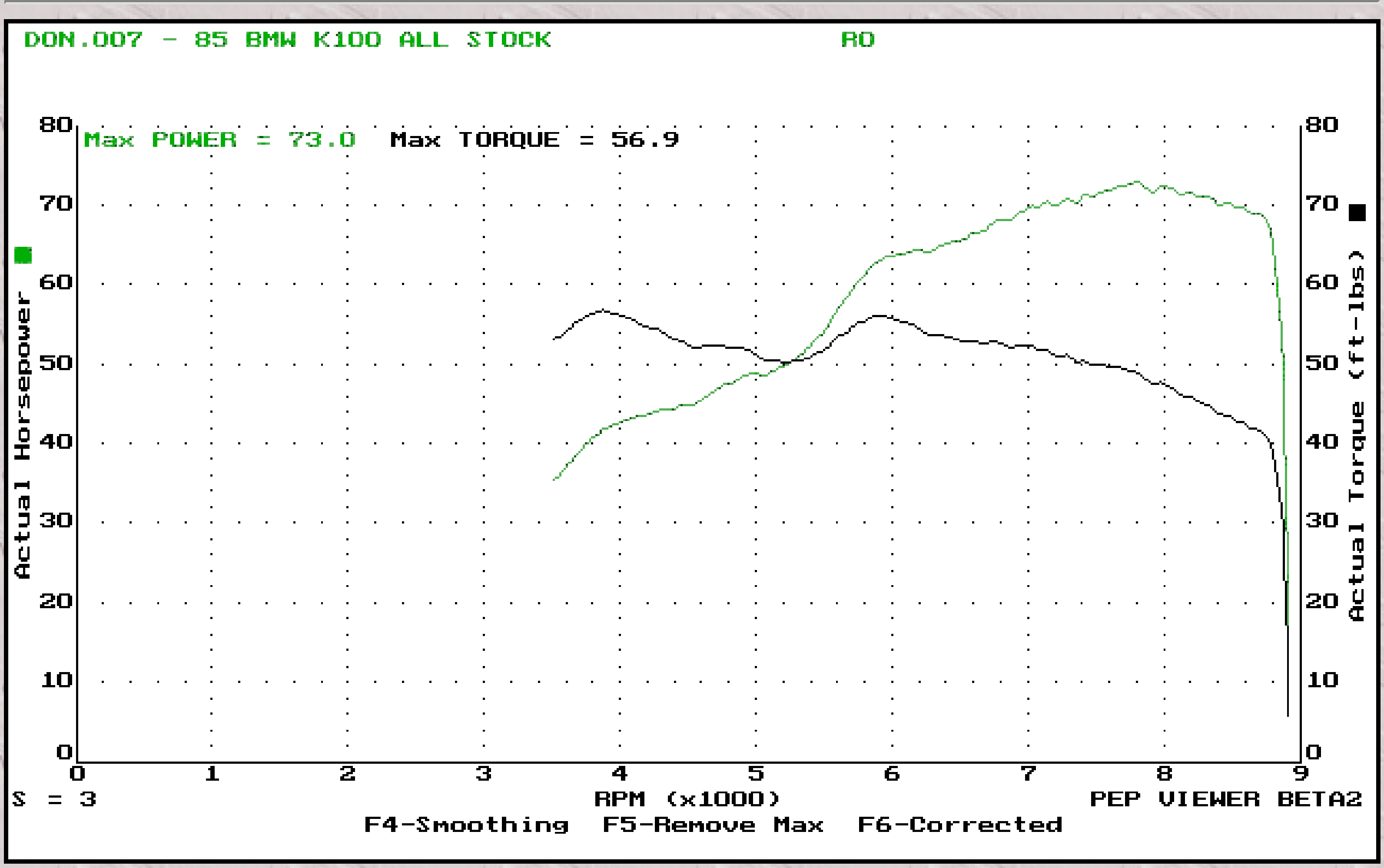

Figure 1, Calibration (Standard) Run

As can be seen by the plot above - the K100 engine exhibits a remarkably flat torque curve. The peak HP shown of 73 seems about right since it is 'rear-wheel' horsepower, and considering the transmission losses in the tranny and rear drive it would indicate approximately 90HP at the engine.

Parameters
Air filter with approx. 15 k miles on it
Timing at 30 degrees full advance at 6 k RPM
Sunoco Ultra, 94 octane
Conclusions: Engine is running within expected parameters. The lack of fine wiggles near the top end of the HP curve indicates that mixture is not overly lean. DynoJet claims that the fine wiggles will appear on engines that are running lean.DynoMain

Intake breathing runs

Stock Filter vs. NO airfilter: This graph compares the output of the engine with the stock airfilter installed and with NO airfilter installed.

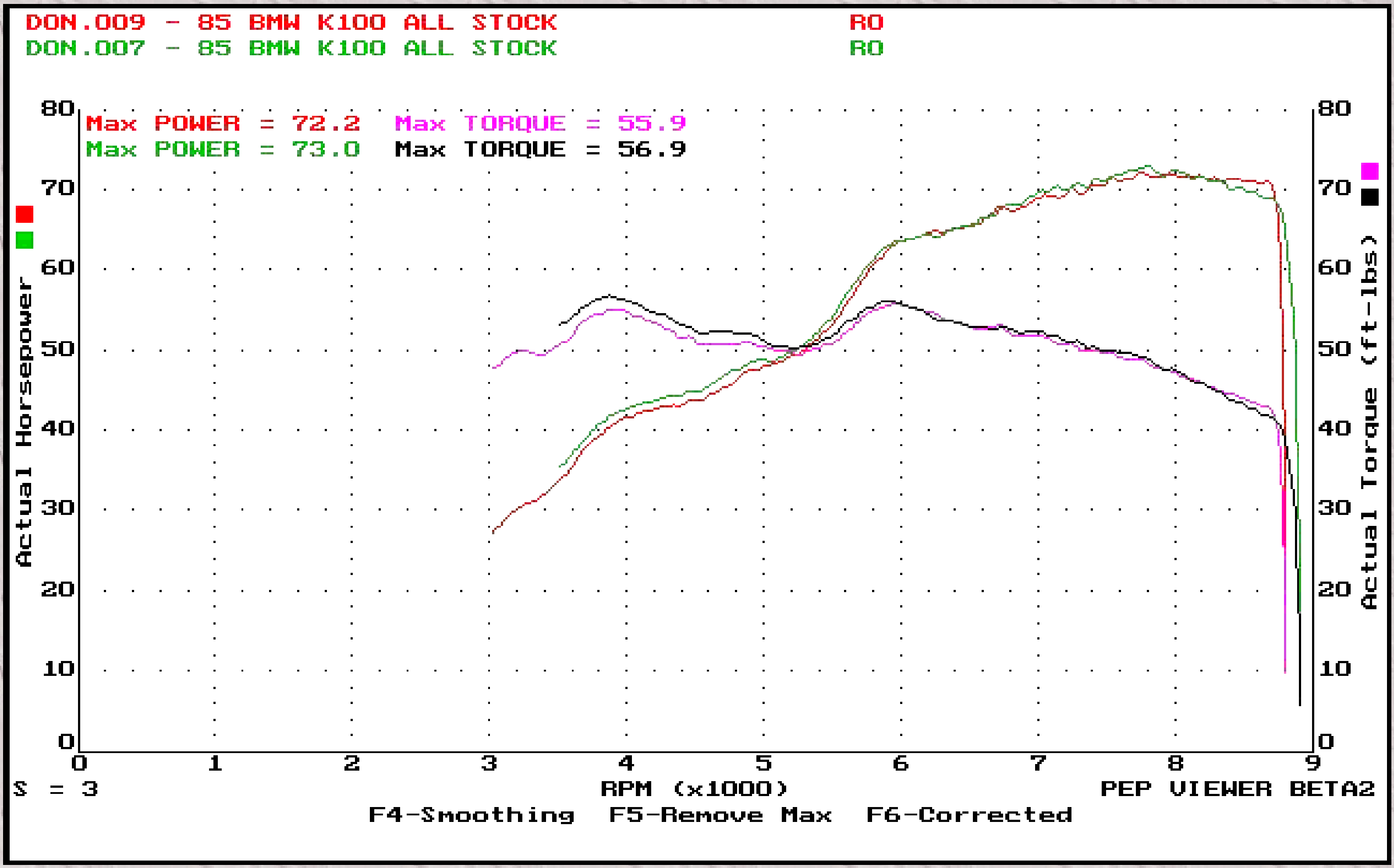

Figure 2, Stock vs. NO Filter Runs

- **Parameters: Run007**
  Stock air filter with approx. 15k miles on it
  Timing at 30 degrees full advance at 6k RPM
  Sunoco Ultra, 94 octane
- **Parameters: Run009**
  No air filter
  Timing at 30 degrees full advance at 6k RPM
  Sunoco Ultra, 94 octane
- **Conclusions:** Considering these runs (and several more we did which were so the runs overlapped), it appears that the stock air filter - even after 20,000 miles is not a restrictive element in the air intake tract in the K bike.
- DynoMain

Stock Filter VS K&N Air Filter (Run 11)

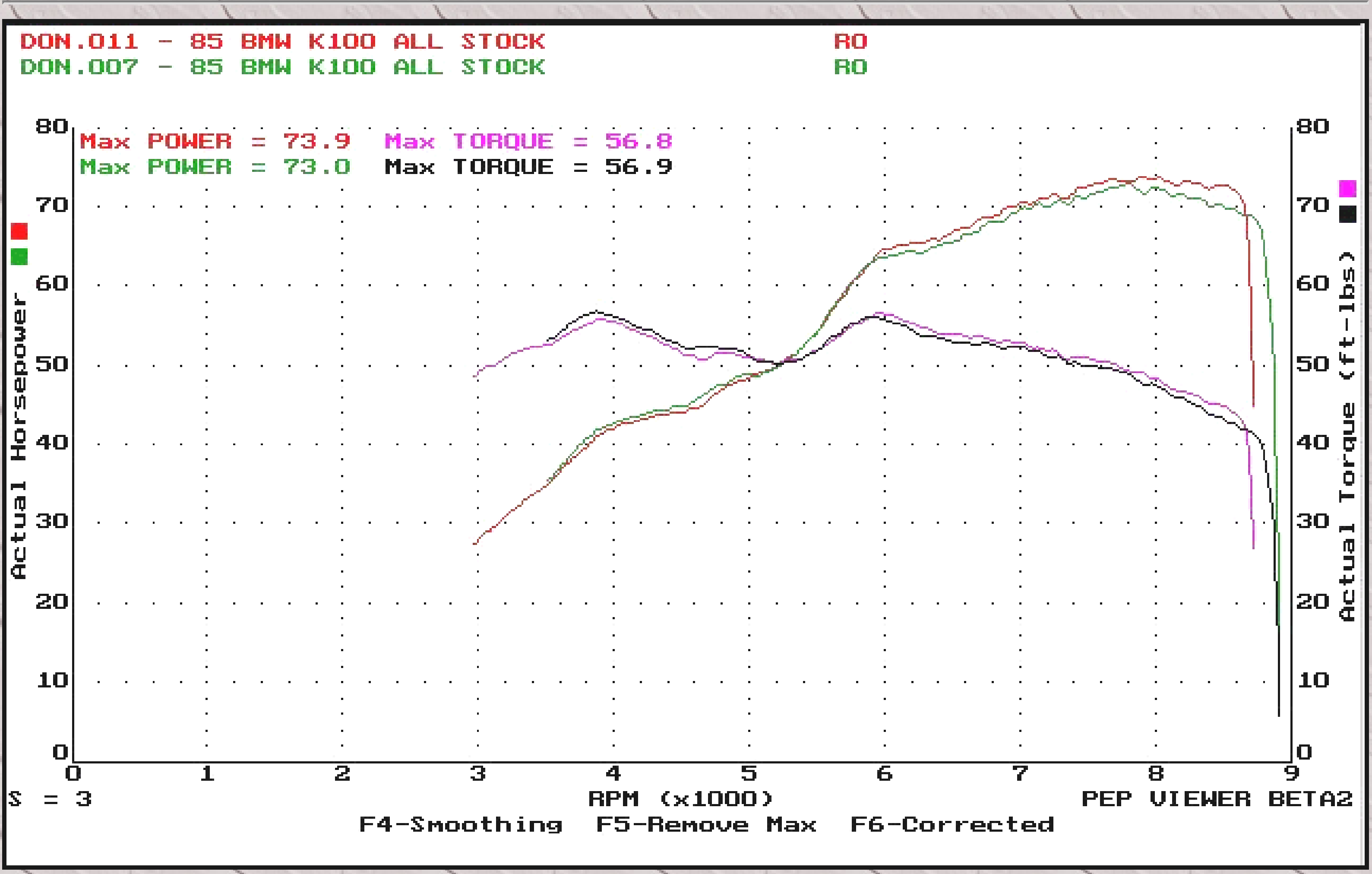

Figure 4, Stock Filter VS K&N Air Filter (Run011)

- **Parameters: Run007**
  Stock air filter with approx. 15 k miles on it
  Timing at 30 degrees full advance at 6 k RPM
  Sunoco Ultra, 94 octane
- **Parameters: Run011**
  K&N Filter approx. with 2K miles on it.
  Timing at 30 degrees full advance at 6 k RPM
  Sunoco Ultra, 94 octane
- **Conclusions:** This run indicated good agreement at lower RPMs and a slight increase (less than 1HP) in falloff of power beyond 8K RPM. We could not demonstrate to my satisfaction any performance improvements using the K&N filter that I feel would be statistically significant. Since the results of the stock filter vs. no filter indicate that the stock filter is not a restrictive element in the intake tract, it would be hard to believe any alternative filter could improve the output of the engine. Unless you consider the reusable aspect of the K&N filter as significant, I do not believe it is a worthwhile investment.
- DynoMain

Mixture Runs

Several runs were taken with the standard mixture settings, and then a run with the altitude plug installed. The altitude plug has the effect of leaning the mixture of the bike by approximately 10%. A gas analyzer was used to determine the effect of the plug on the actual mixture.

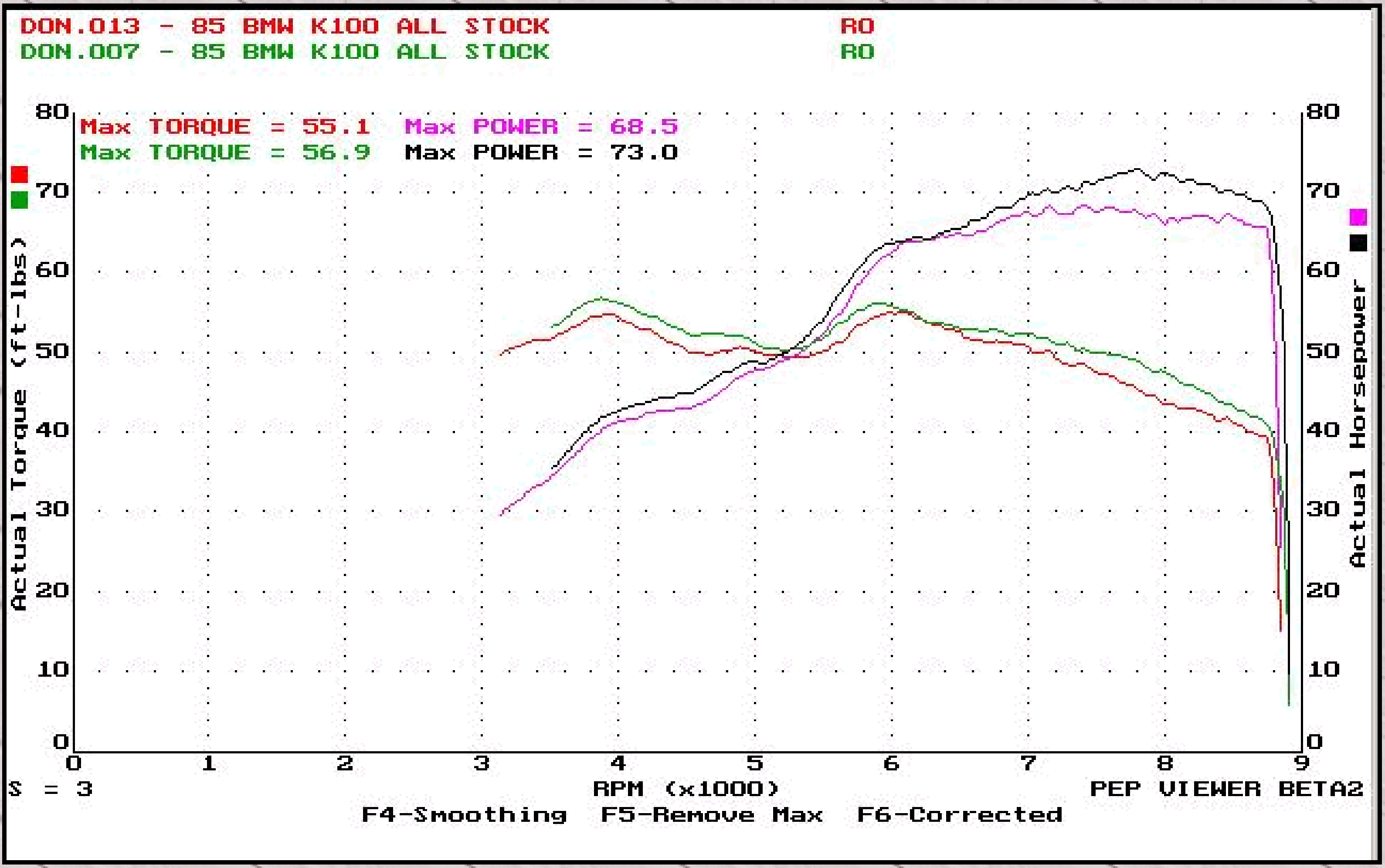

Figure 7, Standard mixture vs. -10% lean mixture

Parameters: Run007
No altitude plug
Stock air filter with approx. 15 k miles on it
Timing at 30 degrees full advance at 6 k RPM (my timing mark)
Sunoco Ultra, 94 octane
CO reading at idle ~1% (while this is low - it did not concern me since I do not ride the bike at idle.)
CO reading at 3.5 k ~1.5% (this is usually accepted as the 'ideal' CO setting off idle)
Parameters: Run013
Altitude plug installed (-10% mixture)
Stock air filter with approx. 15 k miles on it
Timing at 30 degrees full advance at 6 k RPM (my timing mark)
Sunoco Ultra, 94 octane.
CO reading at idle ~0.5% (this is definitely low - a rough idle was the result)
CO reading at 3.5 k ~1.0%
Conclusion: Significant HP and torque loss can be observed over the entire range of RPMs when the high-altitude plug was installed (test was taken at approx. 10 feet above sea level). Mixture is not rich on this engine. Additional tests are indicated - and will be done when I can get to the dyno again - on richening the mixture.
DynoMain

Engine Timing

Several runs were done with the engine timed at various full advance settings (full advance on this engine appears to occur at 6k RPM. The advance is controlled electronically by the ignition computer, but may be modified via techniques described in K bike FAQs on timing). In the case of the runs, we also took a new 'control' run - which is Run016. This was felt necessary since conditions (temperature of the shop, temperature and diameter of the tire) may have changed by this time (we had done a significant number of runs and these runs were actually taken after the runs for mixture that follow.)

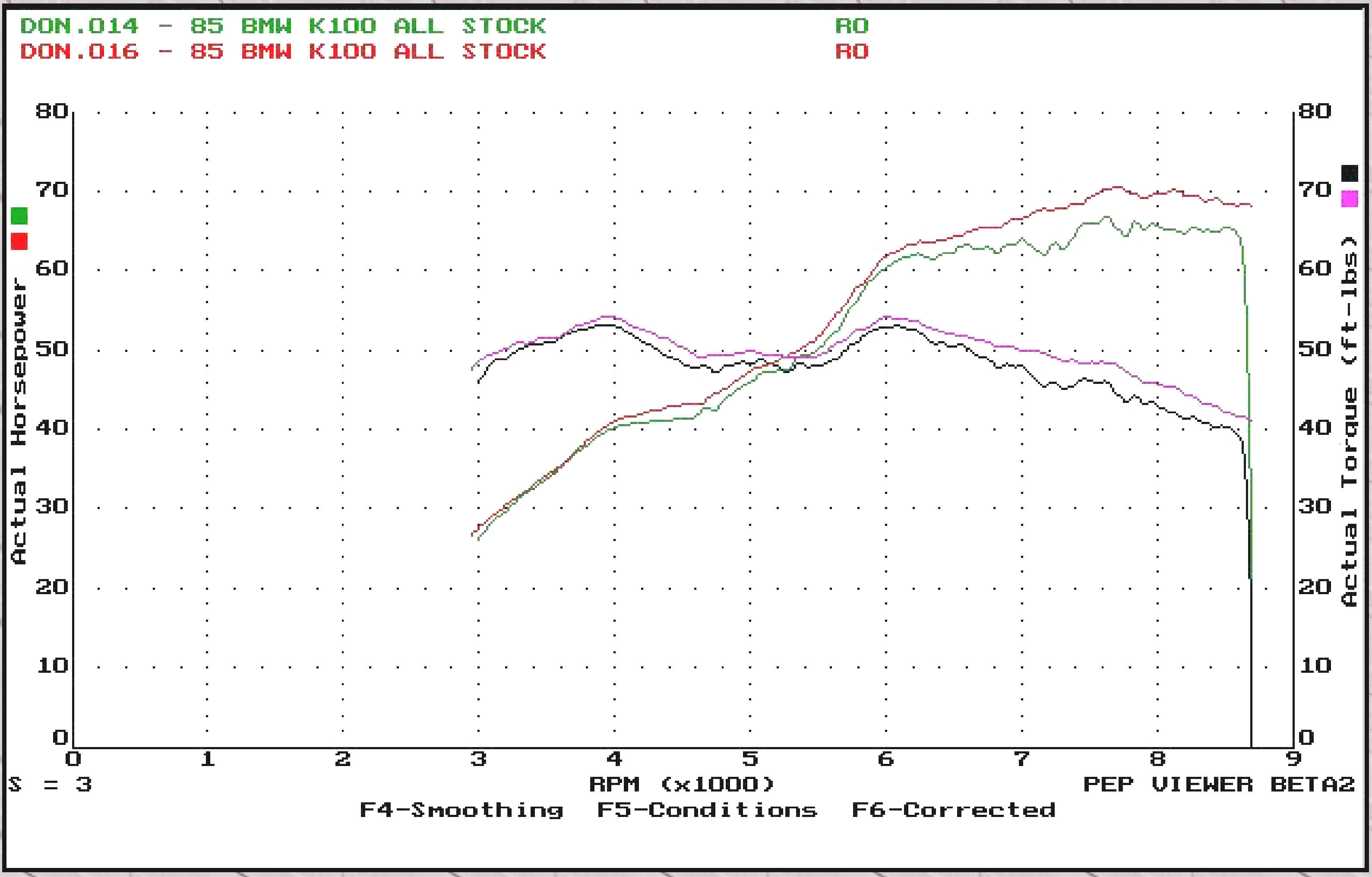

Figure 5, 30 degree vs. 24 degree timing

- **Parameters: Run014**
  Stock air filter with approx. 15k miles on it
  Timing at 24 degrees full advance at 6k RPM (factory timing mark)
  Sunoco Ultra, 94 octane
- **Parameters: Run016**
  Stock air filter with approx. 15k miles on it
  Timing at 30 degrees full advance at 6k RPM (my timing mark)
  Sunoco Ultra, 94 octane
- **Conclusion:** The overall power increase from the additional 6 degrees of timing is worthwhile. I have not experienced any engine damage or noticed any pinging in over 15k miles of running the bike at the 30 degree full advance setting. This is a no-cost improvement for people who already use premium fuel in their bikes.

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- DynoMain

Engine Timing (continued)

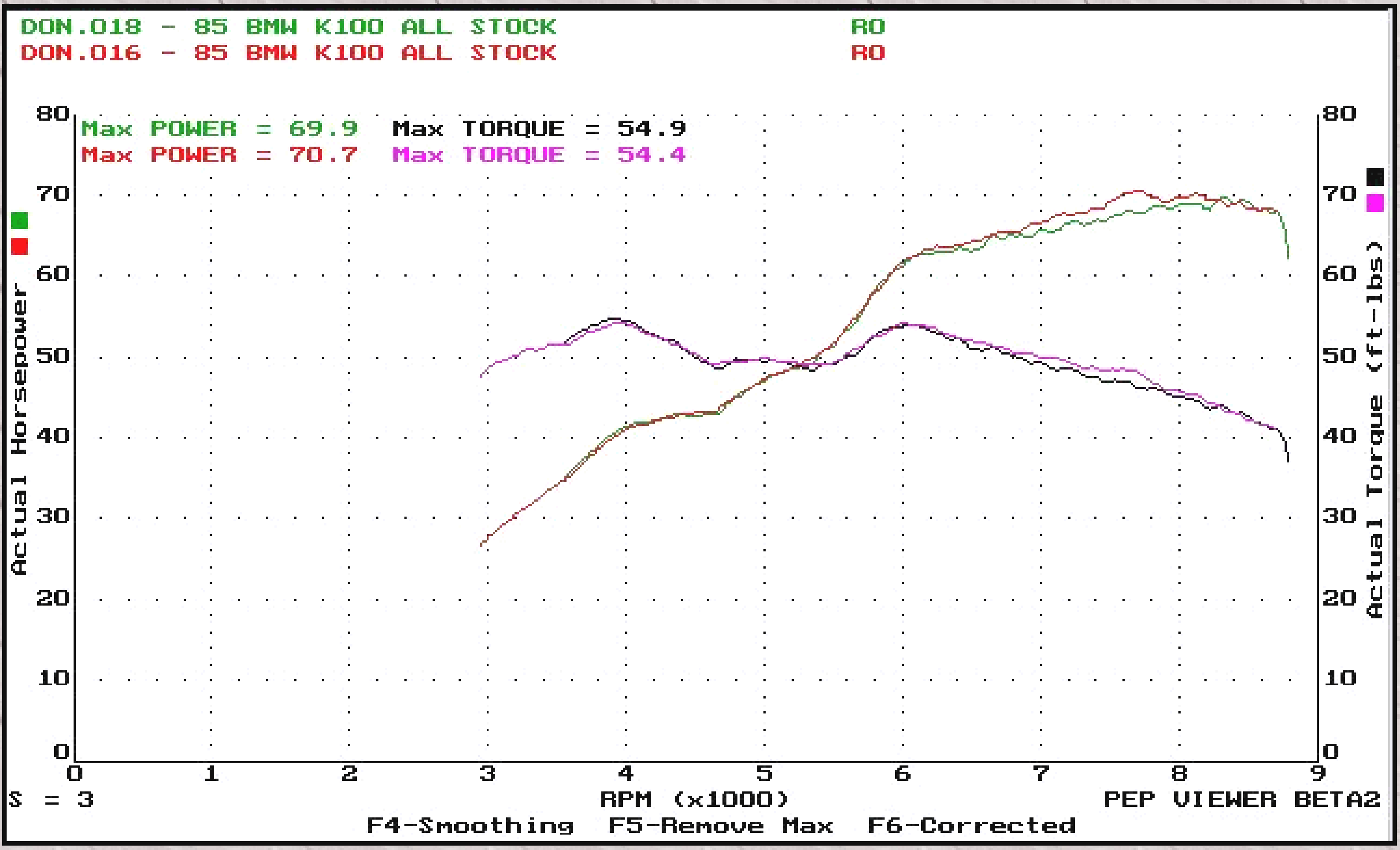

Figure 6, 30 degree vs. 32 degree timing

- **Parameters: Run018**
  Stock air filter with approx. 15k miles on it
  Timing at 32-33 degrees full advance at 6k RPM *(an additional timing mark I had added. Absolute accuracy to 1 degree is not possible given the conditions the timing mark was being observed at).*
  Sunoco Ultra, 94 octane
- **Parameters: Run016**
  Stock air filter with approx. 15k miles on it
  Timing at 30 degrees full advance at 6k RPM (my timing mark)
  Sunoco Ultra, 94 octane
- **Conclusion:** While some slight additional increase in power appears on this graph, it is statistically within the error margins I would consider reasonable for the measurement (less than 1HP). The overlap of the lower RPM curves indicates no measurable gain at the RPMs I normally operate the bike at, and the increased potential for pre-ignition with the additional advance convinced me that MY ideal setting was 30 degrees full advance. The setting was returned to 'my stock' setting (30 degrees full advance at 6k RPM) at the conclusion of these runs.
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Overall Conclusions

Overall Conclusions: Within the accuracy of the test procedures, it appears the **most** cost effective performance increase can be had for **free - *advancing the timing.***
It also appears that advance past 30 degrees full advance at 6 k RPM, while affording a slight power increase at the highest RPMs is not what I would use due to it's potential for incompatibility with a bad tank of fuel.

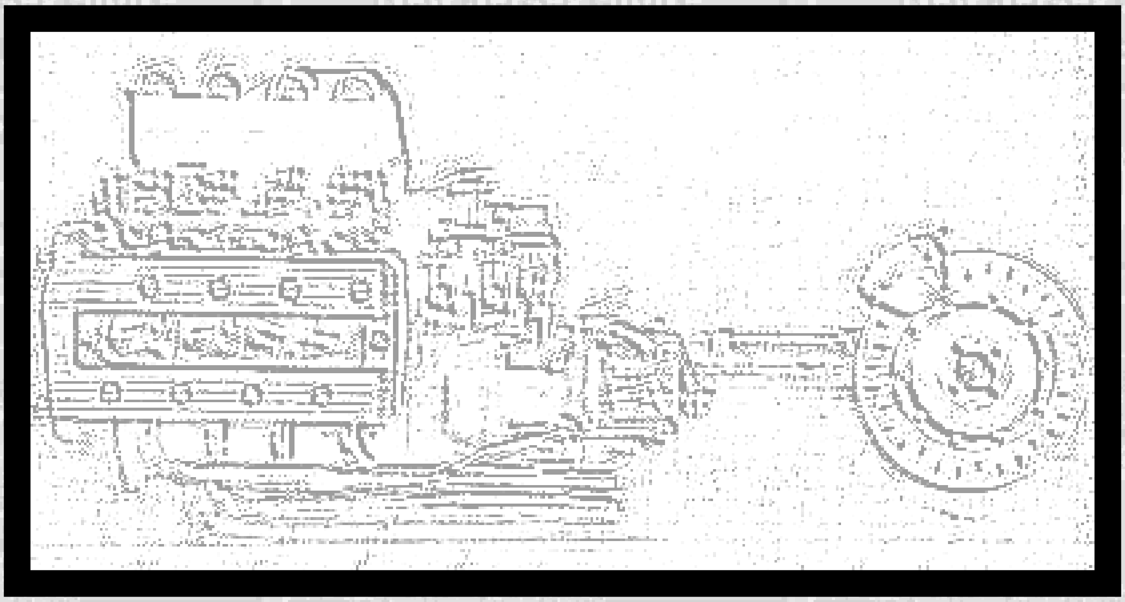
Magic solutions such as the K&N filter do not appear effective, which does not greatly surprise me - the stock K bike filter is close in filtering area to the filter used on the 3.5 l BMW car engines. I do not believe the stock filter is the restricting item in the K bike air-flow tract. In addition, since there is no obvious performance improvement running the bike with NO filter (and the airbox wide open) - the snorkel leading to the airbox does not appear to be a restriction, and indeed under normal conditions (with some ram-air input to the snorkel) it may **improve** the overall output of the engine.

Contacting me:I will be glad to discuss the results above to anyone who is truly interested in pursuing them. ***If you feel I've stepped on your toes by providing facts, please do not contact me (it would be a waste of your time and mine, more or less like wrestling a pig in mud!)*** I can be reached at:
deilenberger@monmouth.com

Don Eilenberger, NJ Shore BMW Riders

Thanks MUCH to Frank Armadruto of Sun Cycle in Manasquan NJ for his help and patience in doing these runs. If you need an excellent mechanic in the NJ area I would be hard pressed to recommend anyone higher than I would recommend Frank!

Also - thanks to Brian Curry and Anton Largiader for the loan of various L-Jetronic components which made the presentation much more interesting, and to Terry Evans for the loan of the K&N air filter!




BMW