

K100 Heat Management Suggestions

Most of the heat comes from the tank getting warm and the seam between the side covers and the tank.

Johnny Blanket: For the latter, you can buy 24" wide double-sided foil insulation at Home Depot and make a "blanket" to go underneath your tank. Several of us at the K110G forum have tried this and it does a good job of controlling the heat. Use that stuff to make a blanket under your tank which covers from the steering head back - then trim the sides to match the bottoms of the battery covers. This will insulate the tank from the engine heat and keep the heat from escaping onto your legs between the battery covers and the tank.

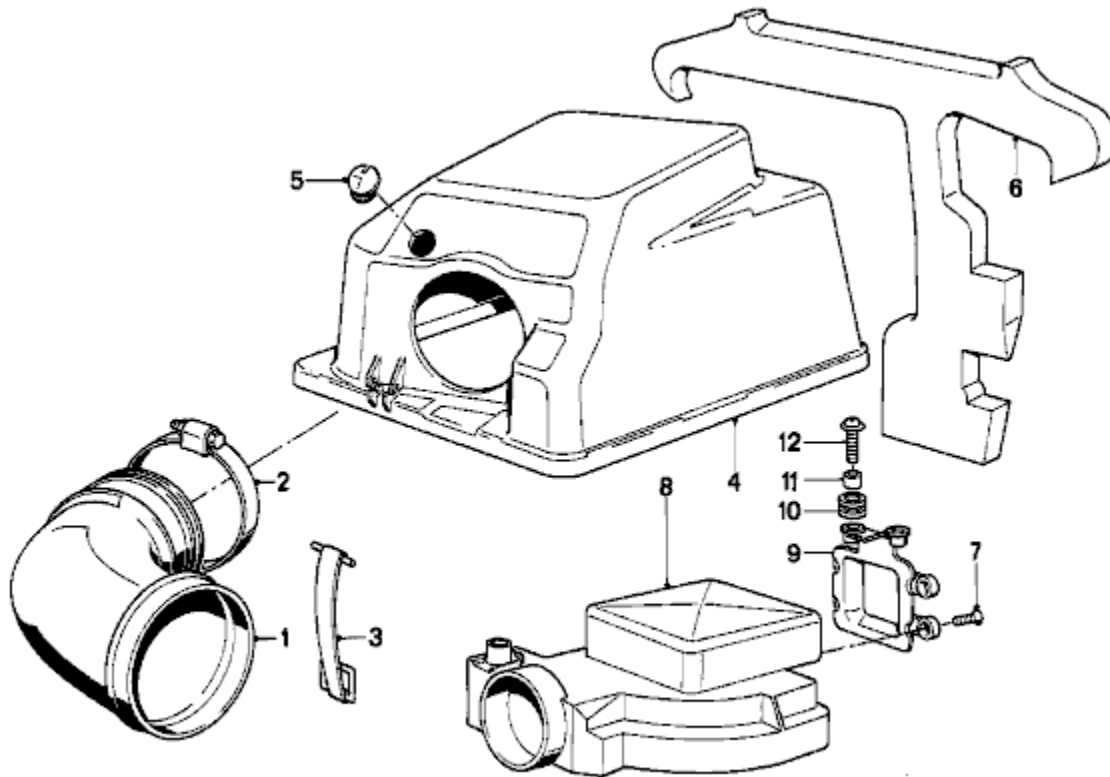
I still find that my knees get warm on my K11LT. But that's when the temp is 90+ outside and the fairing just doesn't circulate air there.

Fuel Line Insulation: Another source of heating your tank is that the return line from the fuel pressure regulator is right behind the radiator. BMW sells 170mm sections of fuel line insulation that you can use to insulate your fuel lines. (I insulated my fuel fail as well on my K1100RS.) Part number 13311461507 It took me about 5 or so sections of that stuff to do all of the easily accessible fuel lines on my K1100RS.

Take off the belly pan. That thing traps all the exhaust heat and blows it up on your legs.

Internal Seals: , be certain the seal between the bottom of the tank and the top of the airbox is correctly positioned. Very often techs in a hurry working against the flat rate will not pay attention to these seals when replacing the black inner fairing panels after a service. The seals should be zip tied to the frame rails and the triangular end should fill the gap between the tank, airbox and inner panel. Often this triangular piece is inside the fairing panel allowing very hot air to blow on your inner thighs. These two things usually cure hot air from K-bikes.

There is a large seal that loops over the top of the air box and plenum and under the frame rails. The sides of this seal are designed to close the gaps between the air box on the right and the plenum on the left, the inner fairing panels and the under side of the fuel tank. Usually, when work is done on the bike these side pieces are not returned to the correct location, leaving a nice gap where the inner fairing panel meets the tank and air box that directs a hot blast of air to the inner legs. If the gasket is placed carefully, the problem does not exist. No need for any modifications.



00002175

Number 6 in the diagram above is the part. Without that you will roast. See the dangling ends? The entire gasket, zip tied to the frame, must be positioned just so and then the ends will seal that gap between the tank, airbox or plenum (depending on the side) and the inner fairing panel. Those are usually moved during any service that requires removal of the inner fairing panels, and are not usually restored to the correct position by techs racing that flat rate clock. Roasted pork is the frequent result!

I went a different route than the Johnny blanket. Rather than let the heat stay under the tank and reroute it out the back past your legs I used closed cell neoprene foam insulation sheet like you use to insulate water tanks. It comes in sheets and different thicknesses. What I did was to use the foam and close up any openings to the underside of the tank where the fan blows and I also closed up the area where the air can get to the radio box and glove box. What this did was redirect the air that blows through the radiator out through the side vents (where it is suppose to go) instead of under the tank. This has made a huge difference in the amount of heat that gets to me. When the fan comes on you can really feel the air blow out the side vents.

I actually haven't put on my fan switch because with putting in the neoprene and putting on a 3 core radiator I haven't felt like I needed the switch.

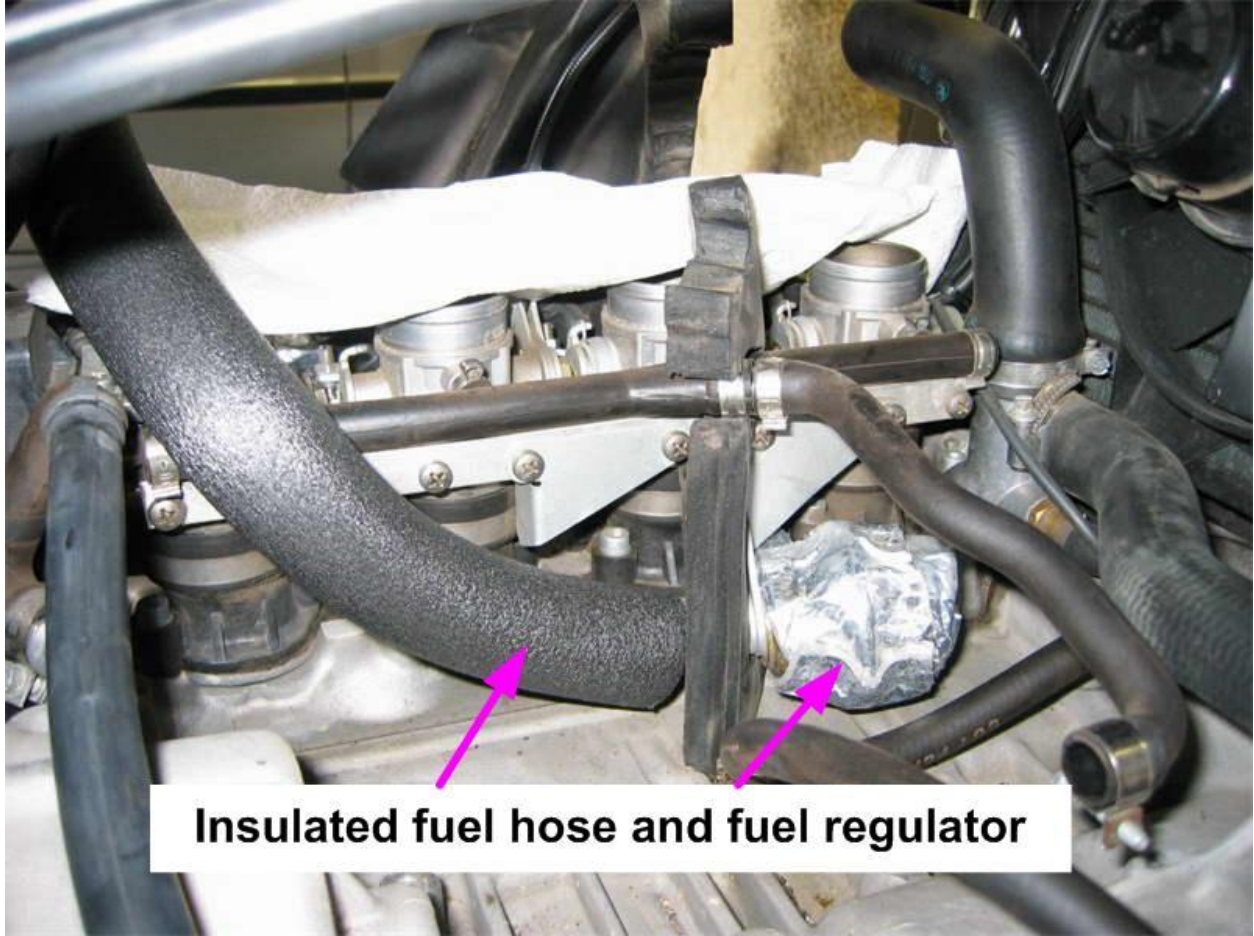
Fuel Line Insulation

http://www.skene.org/k1100/heat_mod/index-heat.htm

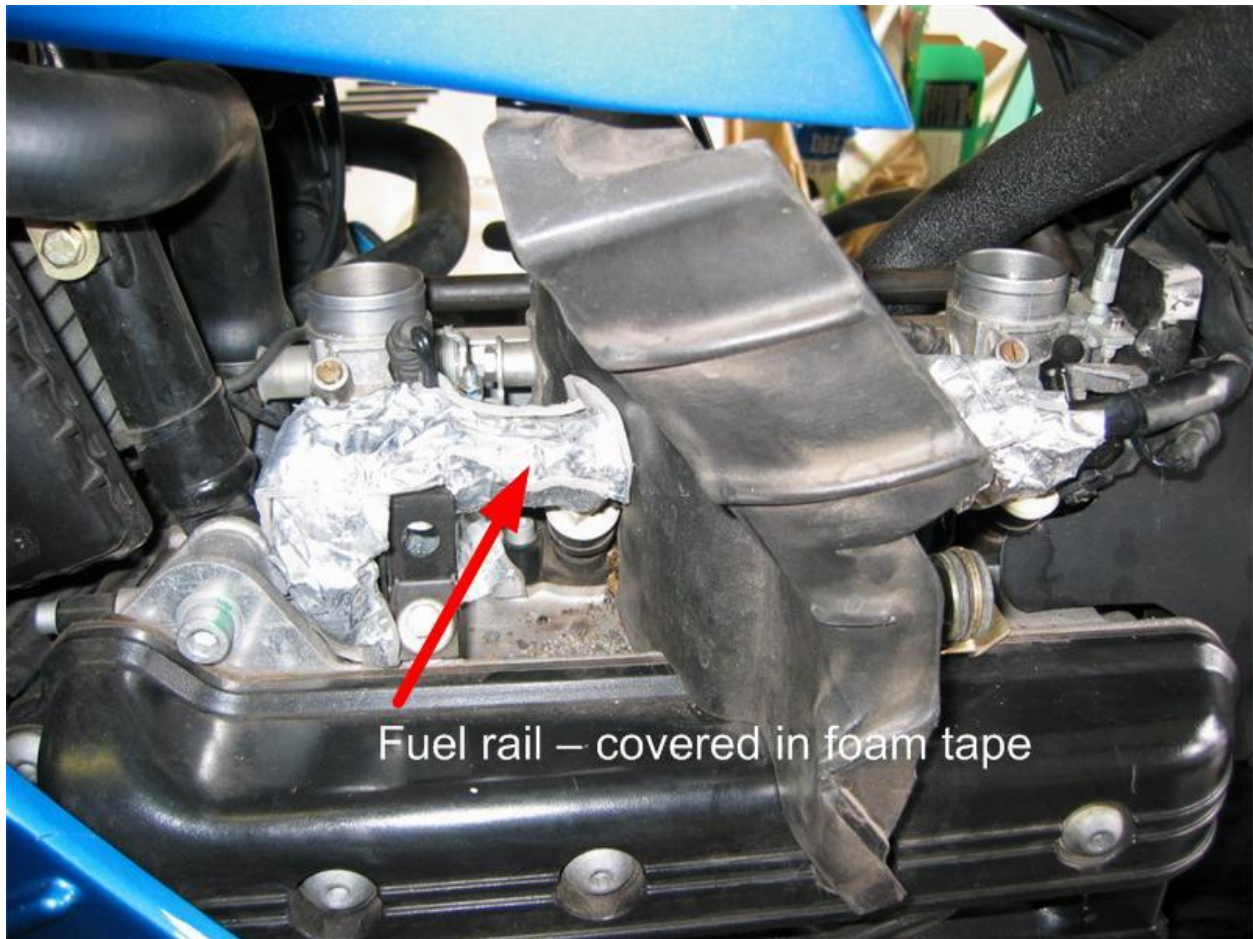
Here in the Washington D.C. area, it gets pretty hot and muggy in the summer. I finally decided to do something about the unbearably hot gas tank on the K1100. As anyone who drives one of these bikes knows, the tank can get too hot to touch. The fuel system design is the culprit here, it seems. Fuel is pumped continuously from the in-tank pump, through the fuel hose, steel fuel rail, fuel regulator and then into the return line back into the tank. All of these items are located just above the engine, and pick up a lot of heat. The constant fuel flow transfers this heat to the fuel and back into the tank.

To minimize this heat transfer, I covered the fuel rail and regulator in heat insulating foil-backed foam tape, and the fuel hoses in foam tubing. These items can be bought from the local home supply store for a few dollars.





Insulated fuel hose and fuel regulator



While I had the air box and air intake tube out, I painted them in heat-insulating paint. The idea here is to minimize heat transfer to the incoming air. The hotter the incoming air to the engine, the more power you lose. While this does nothing to improve rider comfort, it does prevent some power loss on hot days.





I have been running with this modification for some time now, and can report that the tank no longer gets hot, and has never been more than slightly warm, even on very hot days.

I have not seen a noticeable improvement from the air box paint, but I normally don't use more than a fraction of the power that the engine can produce, and have not done any dyno testing.

This modification does not take a great deal of mechanical skill, and costs less than \$10. I can highly recommend it as a solution to the K1100 heat problem.

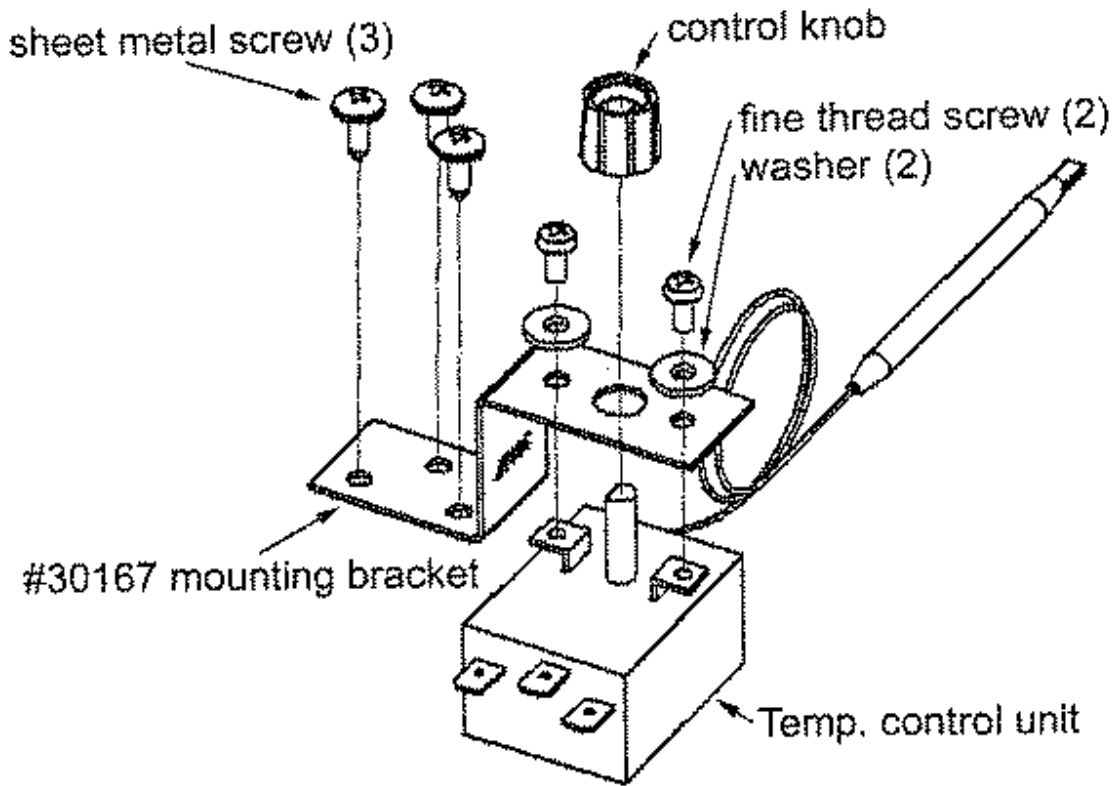
Radiator Fan Switch

Use an adjustable thermal fan switch to make the radiator fan kick in sooner. They're easy to install.

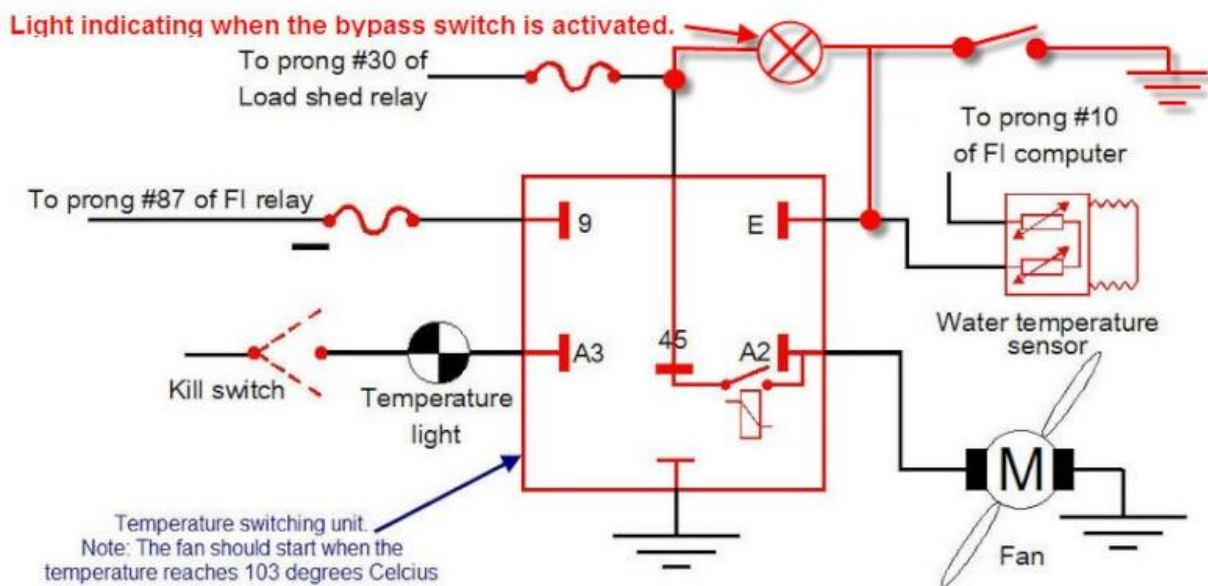
Below is a picture of the Flex-a-lite adjustable thermal fan switch. It adjusts between 180°F and 240°F.

There is a manual configuration and automatic configuration. In the automatic configuration, power can be supplied to the fan even with the engine off to cool the bike right after it is turned off.





<http://www.summitracing.com/parts/FLX-31147/>



Bert (2009)

The relevant wiring for a manual fan switch is :

Fan Relay

Green/Brown - Live feed from Fuse 7

Blue/Yellow - Signal from Motronic Unit
Violet/Yellow - Output to Fan Motor

Fan Motor

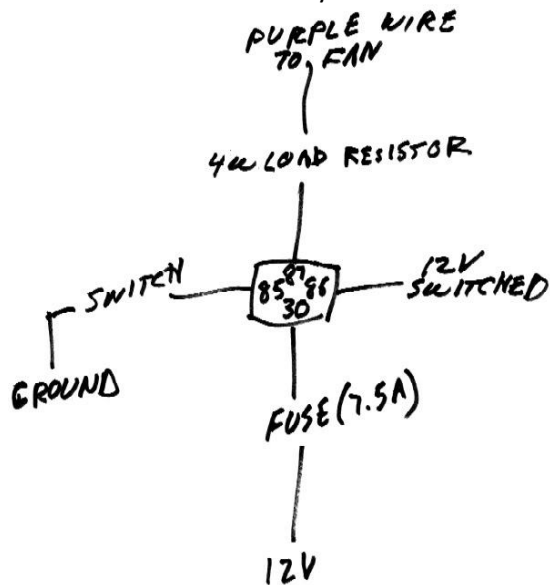
Violet/Yellow - Input from Fan Relay
Brown - Frame Earth

So, you need to trace the Violet/Yellow to a convenient point between the relay and the motor. In practice, that will be just before the connector, which is cable tied on the frame on the LHS under the tank. 😞

A relay rated at 10 amp will be fine, and any choice of switch in a convenient location. This depends on what is in your electronics biscuit tin, or how much you want to spend on OEM switches.

The relay load input/output should use cable of AWG 20-21 or heavier.

The switch side of the relay will draw a few mA, cable of AWG 30 will be fine.



Quick and dirty drawing. So quick that I should've labelled the load resistor **4 ohm**, not 4 amp. Doh! The thing in the middle is of course a relay.

Load resistors generate heat. I used hose clamps to mount it up on the frame right behind the steering head on one of the diagonal members in front of the tank. That way it can dissipate some heat to the frame and there's also air blowing by it.

Yes, when the Moronic wants to turn the fan on it goes to full speed even if my circuit is turned on. The electrons have a choice of taking the route through the normal wiring or through the load resistor. Electrons are lazy and will always take the path of least resistance.

Aftermarket Electric Fan

Flex-a-lite Fan Story

I had more than a few problems with the fan on my K100RS as the temperature here is not forgiving of a system that is not spot on. So after getting fed up with the very old style fan I removed it and installed a new modern design 200mm flat fan that I bought of ebay (\$49 Aus) that is from a small car and moves about 35% more air than the original. While I was doing the job I also reconditioned the oil and water pump, and installed a temp gauge and tapped the pump housing for an oil pressure gauge as well. I then fitted an indicator light and a manual override switch like others have done, this is a direct feed via a fuse from the battery - no relays to fail.

So now when I am sitting at the traffic lights on a 40 deg centigrade day, and the heat coming from the black tar road is even worse I just watch the temp gauge rise and at 95c I press the switch and watch the temp come back down to 82c very quickly.

I no longer have to panic waiting for a green light, wondering if the dam fan is going to work. On the highway temperature seems to stay around 85c and oil pressure is 80 PSI.

The cooling fan that fits like a glove is a

Flex-a-lite Low Boy Electric Fan 118 Puller/119 Pusher.

I think it was about \$46 Aus including freight.



I search around the wreckers for a while looking at what was available, as I think the original fan is a very old design and came across several that I figured would probably fit. So then I figured what was the point of

installing something that was already old out of a wreck and went to ebay and you know the rest of the story. As mentioned to install this fan you will need to remove a small amount of the housing approx 3mm by 30mm where it rests against the left hand side radiator hose. It has been in the bike about 3000 klm now without a worry and Summer is on the way back !!

The cooling fan modifications were carried out at the same time I decided to replace the timing chain so I already had a lot of the engine covers and fairings removed. The extra temperature sender wire and the oil capillary tube were sleeved in heat shrink to protect them and run up through the same place as the original temperature wire via the housing that covers the hall senders. So there is actually nothing to see at the front of the engine.

I removed the radiator and fan assembly from the bike and gently placed the old seized fan in the rubbish bin. Next I covered the back of the radiator with 2 inch masking tape, placed the new fan in place in the engine and re installed the radiator. I was able(with some difficulty) to then use a pencil to mark the exact position of the new fan relative to the rear of the radiator.

Once removed from the bike and repositioned on the pencil marks, it was a breeze to install the new fan with two of the mounts supplied and a few drops of RTV as I did not want to run the straps through the radiator core. I had to remove a piece of the fan shroud about 3mm by 30mm from the 7.30 or 8.00 o'clock position as it rubs on the left hand vertical radiator hose.

In the photos, you will see the switch on and the amber light showing that the fan is running. When the fan is on there is noticeably more air coming from the side vents of the fairing than before.



The fan seems to be available from several countries on ebay and cost me \$49 including freight. Note the water temp in the photo was after only a few minutes of running so had not had time to get warmed up and oil pressure of 70 at 900 RPM. I now give the fan a quick run before leaving home and forget about it.

If you were only going to replace just the fan it would not be much more than an hour or two job.

Jim

Kfan2 Story

1993 K1100LT @ 59,887M

September 13, 2010

I recently purchased this bike from its second owner who had purchased the unit @ 5,000 miles and used it regularly until two years ago when he bought a GS1150. The bike had been stored inside in a heated location and looked and rode very well with a new battery installed.

I rode it approximately 100 miles when I encountered an overheating condition in slow cruising around town. I was less than ¼ mile from home, so I parked it and waited for it to cool.

Being new to K-Bikes, I inquired of my local dealer who said that it was probably the fan and that would be the smart place to start, as he said: "Its either the fan is stuck or the fan impeller has come loose on the shaft and rubbed its blade tips into the radiator causing pinhole leaks."

Being a vintage bike mechanic by trade (The Classic Bike Experience), I felt "how hard could it be to take the fan out?"

Two weeks later, I'm a lot smarter and a lot more informed, thanks to K11OG, which was the first place I went after talking with a friend K-Biker.

I'm sure the stories of anti-theft systems are legion, but if you are determined not to do any damage (I read the MaxBMW price fiches) you will proceed slowly.

It took me two weeks of part-time plodding, but I got everything apart without breaking anything, and found this:



This is a close-up of the brush holders which have both partially melted due to high currents experienced when the bearings became stiff from (age, lack of lube, whatever). The fuse for the fan had NOT blown.

Dis-assembling the fan was a lesson in BMW design philosophy, and I was not impressed by the complexity of the package and the simplicity of the bearings or the fan blade attachment design.

After checking prices for new fan assemblies, (unbelievable), I checked E-bay and was still quite shocked at the prices for well used components.

Ordinarily I believe OEM design is better and smarter than most things aftermarket suppliers come up with, but in this case, the words from my local dealer kept coming back: *"Its either the fan is stuck or the fan impeller has come loose on the shaft and rubbed its blade tips into the radiator causing pinhole leaks."*

For him to react this quickly and be that sure engenders a niggling doubt about the robustness of this particular component. That, plus the fact that BMW only supplies complete fan assemblies at a horrendous price causes me to further think that there has to be a better way.



Pic 2 Another view which shows relatively little wear on the armature, indicating the bikes primary use was highway cruising and had little need for the fan during the past 17 years.

(Brush holder removed for clarity of photo)

During this process, my K-biker friend called me up and pointed me to an E-bay source who was peddling replacement fan motors for a (somewhat) reasonable price by BMW standards.

Now my choices are: \$80 + for a replacement motor or \$320+ for a new fan assembly.

By now I have decided that a used motor/fan of this design is a time bomb waiting to slag my engine with another melt-down.

Still not comfortable with the design philosophy, I start down the re-design road: What size and type of fan can I find which will fit here?

Another perusal of K11OG brings up stories of people adding thicker radiators from earlier bikes and one where somebody said they put on a 10" aftermarket fan, albeit with few details and no discussion of the projects success or otherwise.

Measuring up the OEM fan unit, I start searching for an 8" fan which looks to fit the envelope.

I found two; and 8" unit from Derale and a 7.5" unit from SPAL. Close inspection reveals them to be almost exactly the same envelope, just a difference in where the measurement is taken. Both are about 400 CFM capacity and draw about 5.0 amps at full chat.

Searching Amazon and E-bay, I found many more of the SPAL fans available and I nailed one for \$35 plus shipping.

Now that I have a decision and direction, I have to make some adaptor plates to fit the SPAL fan to the OEM radiator.



First step is to trace the outline of the OEM fan housing to identify the mounting points in relationship to the fan/radiator center lines. Tracing around the housing with a large black Sharpie, I get this.(courtesy of the USPS for drawing material) Next step is to lay in the SPAL mounting holes, see below; a 6" square centered picks up the four 1/4" mounting holes.



Using the fan housing again, I lay out the bracket area with the help of a red pen and a 1.00 washer to radius the ends of the bracket design. The housing was used to radius the fan side of the bracket to

ensure no airflow obstruction. After this, connect the radii with straight lines. It would take a piece of metal 3" wide by 7.0" long to fabricate the brackets.

I choose to use 1/8" aluminum for the brackets, reasoning that the OEM housing was that thick, so the OEM rubber mount will fit and the flat head screws will have the same amount of material to clamp up. Raising the fan shroud 1/8" from the fin surface will not induce a great deal of airflow loss, but if you are worried, a bit of adhesive-backed weather seal will seal that gap. This fan unit is a full inch shallower than the OEM design, so no clearance worries on the back side.

When the SPAL fan arrived, the next step was to verify the mounting hole locations and drill them in the brackets.



This picture shows the brackets mounted to the fan before fitting the fan. The plan is to center the fan and minimize the airflow obstruction created by the mounting brackets. As you can see, the brackets cover a significantly greater portion of the cooling fins than the original fan support legs (outlined in red)

After placing the fan on the brackets and carefully marking the correct locations for the attachment bolts, I removed all the metal that I felt was unneeded for purposes of lightening the weight and increasing natural airflow.

The results shown in the next picture are the finished brackets before painting. The surface shown is the side which fits closest to the radiator. The mounting holes are countersunk with an 82 degree included angle to allow 1/4" flat head bolts to be used without digging into the radiator surface. The outer profile is taken from the radiator so that the brackets do not stick out beyond the radiator mounts at any point. The row of holes in the middle of the bottom bracket is for lightening and airflow.



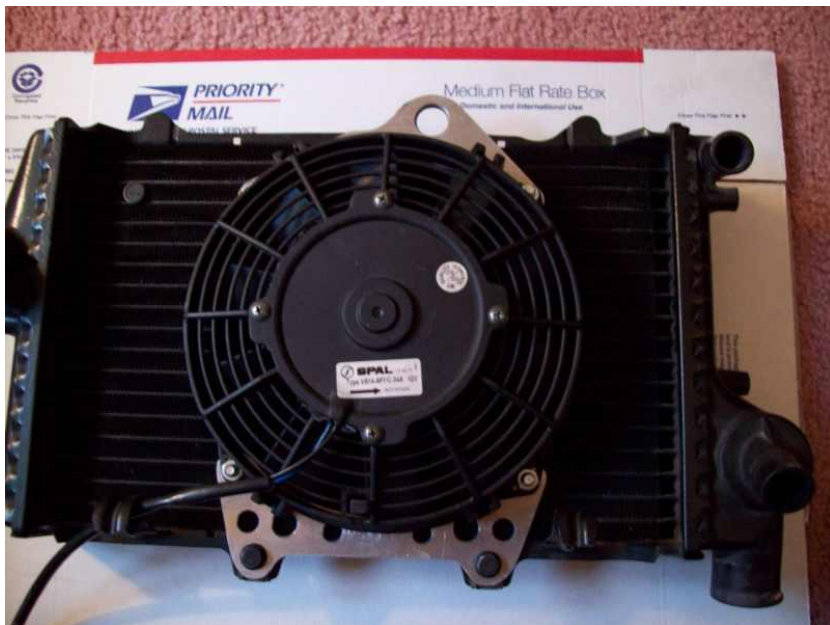
The brackets are mounted to the fan assembly with ¼-20 countersunk screws and nuts for final fit testing. (6mm x 1.00 @ final)



In this picture you can see one of the attractive added features of this fan; an E-clip retains the blade assembly to the shaft, rather than total reliance on a press-fit ala OEM design.



This picture allows the svelte cross section to be shown to maximum with my big feet supplying the scale and appropriate support. Fan = 2.05 plus .125 bracket = 2.175 thickness total.



Here you can see the fan assembly first mounted to the radiator. Two 6 mm bolts of the appropriate thread pitch are used to replace the OEM countersunk fasteners. A fit check on the bike shows no apparent reason for the use of the countersunk fasteners, so I used hex head screws from the "Metric Fasteners" jar on my workbench. The upper mount hole uses the OEM rubber grommet and fastener.



Here you can see the new fan assembly compared to the OEM fan assembly. The tags are the weights of each. Installation will begin after I complete all the tests I should do while the cooling system is apart; Thermostat test, pressure cap test, et.c.

I have made detailed notes and dimensions of the finished brackets and will supply that data to interested K11OG members free of charge. If you would like a full size pattern of the brackets (scanned) or would like to have a fan replacement kit supplied please contact me. If the interest level is high enough, I will build some.

Addendum and update:

After the final fit check, I discovered that the second set of mounting brackets on the fan housing were interfering with the frame tubes, forcing the upper bolt out of alignment.

I ground them off and the fit improved to the point that the attachment bolts installed easily.

This pic shows the ground off mounts. I probably took off way more than I needed to, but it goes quick.



You may also notice that the hardware has been changed. I installed the initial hardware so many times during this process, that it finally became galled and would not cooperate. I got some 6mm screws and locking nuts for the final assembly.

There is another choice for a SPAL, they also make a smaller fan, PN

SKU: 30100402

Mfg #: VA22-AP11/C-50A

This fan is 6.5 " diameter, mounting is 5.31 inch centers (vs 6.0), pulls 330 CFM and outside envelope is 7.24 x 7.03.

Obviously the brackets would have to extend more, but the clearance issues would disappear, making it a faster project with less fuss.

Addendum and Update 2:

Here are two pix showing the fan installed:



Pic1:

You can see just how close the frame tubes are to the sides of the fan housing on the upper half.

Note at the top is the Weatherpack connector added to allow removal without digging under the tank. Yes, I know that two connectors in a power line is not good practice, but neither is placing the connector far away from the component it connects. (are you listening BMW design?)



Here you can see what I was talking about when I said the lower hose clamp had to be rotated out of the way, there is clearance, but it is about double the thickness of the clamp. (maybe .06)

Facts known about BMW OEM Fan:

OEM PN:

Fan diameter at blade tip:	6.50"
Number of blades:	7
Fan assembly thickness:	4.25"
Motor type:	brush
Weight of fan assembly:	1 lb. 6.2 oz.
CFM	Unknown
Current Draw	Unknown (Fused @ 15 amp)

Facts about CBE replacement assembly kit:

Brackets:

1/8" aluminum custom fabricated

Fan:

PN SPALType VA14-AP7/C-34A 12V Puller

Fan diameter @ blade tip: 7.50"

Number of blades: 10

Fan assembly thickness: 2.175"

Motor type unknown

Weight of fan assembly: 2 lb. 3.5 oz oz.

CFM 440

Current Draw 5.5 amp

Nick W

Johnny Blanket Mod for K-bike

I picked up some from Home Depot today (only \$20). I think it should be fine



The \$20 Home Depot roll worked out great. The 24" width of the roll is perfect for a K1100LT. First I cut out a 24"x44" piece and laid it out along the length of the bike. Then I made cut outs for the tank clips and the "cup" that catches any fuel overflow. Also cut a "slot" for the fuel pump connector.



The tank is moved to the side in the above picture (to the right of the picture) the silver foil you are seeing on the bottom of the tank is what came with the bike.

Finally I made a cut out to hook up the side panel. The blanket tucked neatly behind the K-Guard Heat Shields



I used some Reflectix tape to make things tidy. This tape is also heat reflective and sold right next to the blanket at Home Depot.



I've only had a couple of short rides so far but I'm very happy with the results. The Johnny Blanket works as advertised. 😊 Took about 20 minutes to put together.

I put the foil down... the bubbles up... thinking the foil would reflect the heat away... the bubbles would help attenuate the heat that made it past the foil... and not melt of course... since there are no seams and only one hole for the fuel pump wires... the whole thing prevents hot air from flowing where I don't want it... now I have about 5,000 miles on it... no melting noted and still in good shape... there are some popped bubbles where the seat contacts the frame and the like... so far so good...

Baker Air Wings

by [BB](#) » Sat Jul 11, 2009 10:48 pm

I am posting this because I found an easy fix for solving the burning legs problem on my K11. I did the Johnny blanket mod, and doubled it under the seat. Also did the fan switch. That solved the problem for my thighs, but my lower legs would still cook. I then made some lower side covers out of Formica (plastic laminate) scraps I had laying around. I also insulated the back side of them. I couldn't find any used wind wings so I made a pair out of lexan and U-bolts. They are attached to the crash bars and put a lot of airflow past the engine to the ankle area. Hope this inspires or helps.

Brent





by hockeyshifter » Sun Jul 12, 2009 11:06 pm
hey the mod looks good ... my suggestion would be as follows.

use Stainless steel hardware sold at Home Depot. also upgrade to at least a size that is greater than 1/4 of an inch but going for 3/4 inch is to stiff .. plus you can buy different colors... As for heat control, I know the bike does put out a lot of heat. To close off the opening between the fairing and the knee pad cover is wrong. There is just no place for the heat to go but UP while standing still; and then, while moving, to direct more heat to areas that may not be properly insulated .. I know this heat will destroy just about anything made by man .

K-Guards

A friend of mine makes them up. Tony Tabot. Bartlett, Tn. It's next to Memphis Tn..
Give him a call. 901 314 0143 If U ride up there, he'll install them for ya. Tell him Barry refered you to him. I'm the one who got him started making them. There is a site I've seen on the internet showing him installing them ,but I can't seem to find it.

Quote Originally Posted by deilenberger View Post

I believe he went out of business - but I seem to recall in the deep dark recesses of my mind that someone else bought the molds and was thinking of doing a run.

They were of marginal help on my '85 K100RT - like Ralph, I finally gave up and sold the bike because I couldn't stand the heat (so I got out of the kitchen..)

/Quote

The ones in my post are the new ones. I bought them a couple of years ago. If memory serves me the guy was a friend of 'BarryG' (could be a different name) from Marion, AR. Seems like they were \$120 shipped????

Quote: Originally Posted by roncooper View Post

His name is Tony Tabat and his phone # is 901 314-0143.

I have a set of his guards and along with an extra layer of insulation under the tank and seat, my 91 K75RT is bearable in the TX heat.

/Quote

You are correct sir. you have jogged my memory.

Ralph Sims





On my way to Deal's Gap from Austin, Tx, I stopped in Memphis so Tony Talbot (and his wife and his five daughters) could install some heat shields on the 1985 K100RS. His phone number is 901-314-1043. Tony doesn't respond to e-mail much. If you call him, he'll make up a set and send them to you. Or, if you want to roll by his place in Memphis, about 5 minutes off I-40, he'll install them. Background: Tony makes the heat shields with a vacuum set-up from his Star Wars Wedding. You know a guy who makes Darth Vader costumes can do some good heat shields. He showed me some of the storm trooper helmets, and a dining room table full of star Wars memorabilia. Look for it on YouTube." I did. Kind of scary, how many Star Wars weddings there are on You tube.

Remove the starter cover and install the mounting bracket in its place.





Note the custom pink rear brake reservoir retainer. This is an after-market item. It's part of a solution to the 1985 low-mount brake reservoir that degrades in sunlight. Any reservoir with a longer hose will do.



Remove the coil cover, and bolt the right heat shield on using the existing bolts and holes.



The view from above. What you cannot see in the photos is a 1" gap on the front of the shields. This set was designed for an RT which has a longer fairing. Tony pieced in some spacers for the RS, took the measurements, and says he will design a new set of RS. The shields worked well as I sat in line behind the Harleys on the Tail of the Dragon. Shortly after this picture, I over-took 80 cruisers on 616 curves, averaging 1 HD per 7.7 curves. The shields really prove their mettle during commutes in the 100 degree weather we're having in Texas.

Good job, Dude!
Damun Gracenin
Austin, TX
1985 K100 RS

Manual Fan Mod
