Reader's Wiring Advice

In the August 2003 issue of MCN, a reader asked if fitting halogen turnsignal bulbs (changing from 5-15 watts to 15-50 watts draw) would present a problem to a bike's wiring system. The advice given by MCN was not technically sound, and could present an unsafe condition.

Before stating that the load increase of the halogen lamp should be okay in the bike, one should (1) understand the characteristics of grouping wires in electrical harnesses and what that does to affect the wire's electrical rating, and (2) understand all the components within the circuit in question.

Assuming a jump from 15 watts to 50 watts, the current would rise from 1.24 to 4.17 amps for a 12-volt system. This is a considerable increase in current over the OEM design.

When a wire of any gauge is placed in free air with no other wires surrounding it and is 100% free to dissipate its own internal heat, as all wires do, the maximum current carrying capability of the wire can be specified. But when this wire is placed into a harness with other wires, including large current carrying wires and wires carrying low-level currents (e.g., sensing wires), the wire's ability to safely carry its free-air current rating decreases.

There are other factors that affect the wire's current carrying ability. They are: The ambient temperature surrounding the harness; the total number of wires in the harness; the number of wires in the harness carrying current (versus low-level DC signals) and the temperature rating of the wire. Additionally, the harness is usually wrapped with tape, thus decreasing its ability to dissipate heat, further reducing the wire's safe current handling capabilities. The final factor, which many may not believe, is altitude. An increase of 5000' in altitude will actually decrease the wire's ability to carry current safely.

Another point missed was the other components in the circuit where the halogen lamp was to be used. What about the current handling capability of all the connectors and their associated pins/sockets in the circuit? What about the switch ratings controlling the intended halogen circuit? Without the specifications of each component in the circuit, it is naive to just add components to a circuit and assume all will be okay.

As a subscriber to Delphi's Magna Forum, I know of too many folks who have wound up unable to start their bikes after they modified the electrical system by adding additional lighting, simply using the existing headlight switch and not a relay. After a few months, the headlight switch, which also contains the starter switch, self destructed. The starter section of the switch was also destroyed. Why? By tripling the current through the headlight switch, which has its own internal resistance, the resulting heat generated across the internal headlight switch components also tripled. In time, the switch failed.

Please keep in mind that OEM designers engineer for the standard system design, not for what owners may add to the bike's original design. OEM switching and connecting components are rarely designed to handle three times the normal load of each circuit. If they were, the bike's weight and cost would certainly increase.

To properly add a component to an electrical system, one needs to analyze the entire circuit, which includes all the wires, connectors and their associated pins/sockets, switches and the circuit protection device(s) present to ensure the added device can be put into the circuit safely or that a separate circuit may be needed. Readers can learn how a wire is affected within a harness by temperature, altitude, harness percentage loading and the wire's temperature specification by surfing the web to look for FAA document 43.13B, and reading through the section regarding electrical wiring.

Jay
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Jay, thank you for your analysis of the subject. The advice we supplied comes from the practical side, from a mechanic who's done it, and seen how well it worked. We're not sure anyone would ever add an electrical accessory if such an effort as you describe had to be undertaken first.

Re: H-D Air Cleaner Oil Drool

The oil in the Screamin' Eagle air cleaner does not come from the accelerator pump "washing the oil out of the air filter" as Mr. Niblack states. The accelerator pump squirts into the carb bore, not the air cleaner. The oil coming out of the air cleaner is due to the Screamin' Eagle filter system having very poor oil vapor control. Note, it is labeled for "OFF ROAD USE ONLY," and does not have to meet E.P.A. requirements. With real competition bikes, some oil vapor is okay. The factory air cleaner has to pass E.P.A. specs for both emissions (fuel vapors) and sound.

The crankcase venting in the stock air cleaner is far superior to the "performance" part but *not* because the stock air filter "absorbs" the oil /fuel vapor.

If you use a K&N air filter in the stock housing you will have increased performance, no oil drool, and will never have to buy another element again since the filter is cleanable. Another advantage to using the stock housing is that the air filter stays cleaner longer because of the "baffling" in the air inlet tract. Also the "driveability" is improved with the stock housing in inclement weather due to the fact that water cannot enter as it can with the "performance part." The "gas spray" coming out of the carb is due to the combination of camshaft overlap and short intake manifold runners, when you abruptly open the throttle, the manifold vacuum drops to zero allowing the air/fuel mixture to be forced out the mouth of the carb. With the stock housing, airflow velocity is maintained better due to the air volume of the housing.

Also, not scolding Mr. Niblack for washing his air filters with gasoline is poor form! Gasoline is very dangerous for cleaning parts. K&N has a filter service kit available through most good bike shops and auto parts houses. The kit has a very good cleaner that will not deteriorate the air filter and has the correct oil to use, too.

Mark Topping
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Non-Synthetic Break-In–How Long?

I picked up my '04 FJR 1300 in July and now have 3200 miles on it. I would like to use Amsoil in it, but get different opinions as to when it would be best for the change.

Normally (with petroleum based oil) I change the oil and filter every 1500 miles when I'm out on the road touring. The rep for Amsoil says anytime after the first two oil changes is okay. The FJR dealer says when it is well broken in after 7000–8000 miles. Since I bought the bike in large part based on your testing/evaluation, and likewise will be making the change to synthetic oil due to your testing, I'm curious what your definition (in miles) of "well broken in" is? Or, at what point would you feel right making the change? Also, because the dealer was reluctant to fatten up the CO percentage as you recommended, I had a Techlusion box put in, but would like to find a "Five Star" dealership to do the fine tuning. How do you find the Five Star guys?

Thanks for your help! You guys remain my primary source of honest and dependable info....keep it coming!

Mike Nelms
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P.S. The FJR is everything you said it was, including the heat management issue…but *WOWSERS!*, what a ride.

Okay, we love synthetic lubricants and use them in our personal bikes, but still change the oil about every 2000 miles, because the oil has several purposes. Yes, it lubricates moving parts, and helps to cool internal components, but it also cleans the engine of metal debris, products of combustion and other nasty stuff that is circulating in the engine. I know it's expensive to change the oil that often, but it's not bad compared to the price of replacement parts over the years.

As far as when is a good time to switch to a full synthetic, it's our opinion that it can be done after the rings are seated and all the other parts are properly worn-in together, typically after 5000 miles is fine.

When looking at shops, look for the use of proper diagnostic equipment such as a dyno and EGA machine. If you find technicians that tune just by the 'seat of the pants' or 'by ear,' it's time to look elsewhere if you want a really precision result.

Preventive BMW Surgery?

I recently experienced a problem with my 1994 BMW R1100RS. I bought the bike a year and a half ago with 20,000 miles on it, and have put 9000 miles on it since then.

I met up with a friend in neighboring Pennsylvania and we went off in search of some tasty back roads. While on a gravel logging road in the proverbial middle of nowhere, my engine just stopped. Up to this point, it was running normally, and I continued to have electrical power, gas, oil, and no leaks—it would just not turn over. After checking for blown fuses or loose wires and scratching our heads in frustration, my buddy rode out for some help. Several hours later, a tow truck got me to a small town, and I eventually found a truck to bring the bike home in. A service tech at my friend's BMW dealer told him over the phone that it sounded like the Hall Sensor; that this is a common failure on the '94 and '95 R-bikes, and that he had one fail on a ride exactly the same way.

But when I got the bike back to my dealer, they determined that the fuel pump had failed—definitely a less costly repair. After a new pump and a major service, the bike is running fine again, and my dealer's service tech reported having seen only one Hall Sensor ever fail.

My question to you is this: Is the Hall Sensor in fact a common failure on this bike, and is it something you would recommend replacing based on age? I love this bike and frequently take extended rides. I would prefer replacing the sensor as "elective surgery" if it is likely to leave me stranded again.

Rick Stout
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Yes, the Hall Effect sensors in these units fail, and we have seen many bad ones over the years. The problem is that they do not fail with age, but rather suffer heat-related problems. In most of the cases that we have seen, the units open up internally when they get hot, and they can be checked with an ohmmeter. Frequently, when the sensor starts to go, it shows up as an erratic running problem when the bike is hot (before it quits completely). There is no point in replacing a good one in an effort to prevent a failure, since we have seen new ones fail if the overheating problem that caused it is not corrected first. But, since you don't say that your bike is running hot, we would just enjoy the miles.

Triumph Backfiring

I have a 1997 Triumph Thunderbird and sincerely hope you can give me a definitive answer to a question that's been bugging me for some time now. I installed the Triumph off-road silencers and did not have the carbs rejetted. The Triumph dealer service manager told me that it wasn't necessary, but I talked to other service managers, and they told me that it *was* necessary. I also talked to other T-Bird owners who have the silencers and got mixed answers. Some rejetted, some didn't. The cost of rejetting is approximately $400 (parts and labor). Before I put out that kind of money I would like to know if it really is necessary and would it make that much difference in the performance of the bike?

Charles Remus
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Since the only change you mentioned is the exhaust, it is certainly questionable as to whether or not you need to change your air fuel ratio. The first thing we would do is look at your plugs to see if they are operating in the proper heat range. If they look too lean, the next thing we would do is to run the machine on an EGA machine to make the final determination.

Triumph Speedmaster Backfire

Your review earlier this year of the Triumph Speedmaster mentioned a significant backfire problem on deceleration. You speculated that this was occurring because the dealer neglected to rejet after fitting it with Triumph's "off-road" pipes.

A few months after purchasing my Speedmaster, I received an unexpected $500 voucher from Triumph and decided to spend it on the same pipes that were on your test bike. When I dropped off my bike at the dealer, I mentioned that I was concerned about backfiring. They assured me there wouldn't be a problem because they were going to properly jet the carbs. When I picked up the bike, however, they relayed to me a note from the mechanic stating that the pipes were designed such that "cold air" was able to mix with the exhaust, thereby making it impossible to "tune-out" the resultant backfiring.

Rather than argue with them about their explanation, I did some investigation. I found several posts on the Triumph RAT forum that pointed to the air injection system as the problem. I purchased and installed a plug kit (similar to http://www.new-bonneville.com/html/ai_removal_kit.html), tweaked the idle mixture and got rid of the backfiring.

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Ref. Carb Lines Overflowing

Leaking float valves may not always be a matter of a worn needle and seat. I have solved many leakers when, on close (magnifying glass) inspection, I see no wear.

The problem can be that the tang on the float that controls the needle is found to not be at right angle to the needle at the moment of seating. Fixing this sometimes requires some fancy work with small pliers, and maintaining the correct float level is part of the challenge.

If the tang has a pocket worn into it from the needle pin, I file this out. This has always fixed this problem. Viragos have a curved tang and taking about half the curve out has always worked. Probably excessive side clearance on the needle is what aggravates this problem.

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Downtime Files

is a joint service of *Motorcycle Consumer News* and the American Motorcycle Institute of Daytona Beach, Florida.

Please keep in mind that since the AMI staff has not seen your motorcycle, the answers given are best-guess assumptions based on prior experience and education, and may not necessarily be correct. When in doubt, take your motorcycle to a qualified shop.

Send your typewritten questions and photos if possible to:

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P.O. Box 6050
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Send e-mail questions (with any attached images in jpeg format) to:

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