Transmission Gear Position Switch Troubleshooting

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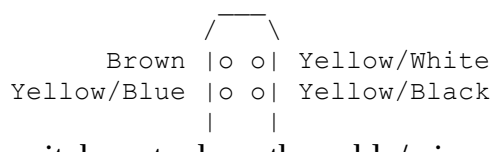
A number of people have reported their transmission gear position indicator (TGPI) getting goofy after running in the rain or washing their bike. They report that it gets better if the bike has some "drying" time. It sounds like water is getting into the switch and when it drys out, it works OK. If this 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:



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.