Motronic Fault Codes, TPS Diagnostics, Fan Test and ABS Fault Codes.

This article is a copy of a post by Mick McKinnon (bmwmick) on the K11OG Web site.
The complete post can be seen on the K11OG forum
(Thanks to K-Bike for posting the link to this article on the K100rt forum)

The following applies to 1993 K1100 K-Bikes but 'may' be valid for ALL 4-Valve K-Bikes with Motronic 2.1 and 2.2 Engine Controls (1989-1997) and all R1100 bikes with Motronic 2.2.

There is a black 3 pin diagnostic connector on the left side of the bike above and to the left of the battery, you will need to remove the side cover to gain access. This connector will have a blue plastic weather protector connected to the open end. Pin #1 will have two Brown/Black wires, Pin #2 will have one Brown/White wire and Pin #3 one Brown/Green wire.

Here are the pin functions for this diagnostic connector.
Pin1: Motronic Diagnostic Fault Code Read-Out and Fan Test Activation
Pin2: ABS Diagnostic Fault Code Read-Out and RESET
Pin3: Motronic Diagnostic Activation of the Throttle Position Sensor Test.

Motronic Fault Code Readout:
Connect a common 12V LED (One acceptable LED is a Radio Shack Red LED P/N 276-270)
to pin #1 (+lead to Battery + , -lead to Pin#1). The LED is not necessary for K-bikes, the temperature warning lamp to the lower right of the tachometer will flash the diagnostic codes.
NOTE: When performing this test on an Oilhead you will need the LED since there is no temperature warning lamp.
Turn the ignition ON and short pin #1 on this connector to ground for 5 seconds, the temperature warning lamp near the tachometer will flash in unison with the test LED you have connected above. The temperature warning lamp and the LED will illuminate solid for about 2.5 seconds, then a give a number of short flashes, count the short flashes. This flash-count is the first digit of the stored fault code. Approximately 2.5 seconds of no light follows the first count, then it will flash the second count (second fault code digit) and this is repeated for the third and fourth count. This repeats until you turn the ignition off. The beginning of each fault code display sequence will be indicated by the 2.5 seconds of solid on of the temperature warning lamp and/or the Test LED.

NOTE: The Motronic Control Unit only displays 1 fault code at a time (4 digits) even if there are multiple faults. Once the first displayed fault has been recorded, repeat the Ignition OFF, Ignition ON and ground pin #1 for 5 seconds to display the next stored fault code.
Continue resolving faults until "4444" is displayed indicating all faults have been resolved.

NOTE: 1122 and 1133 faults can be spurious in nature. If either of these codes appear and you do NOT suspect a Hall Sensor problem, (In other words, you are NOT diagnosing a no-start condition), crank the engine for a few seconds and the Hall Sensor fault codes should clear. You will have a 4444 code which indicates No Faults Stored.

Code Fault
1111 CO potentiometer not detected with Oxygen sensor disconnected
1122 No signal from Hall Sensor #1 (Upper or TDC Sensor, Coil 1/4)
1133 No signal from Hall Sensor #2 (Lower or 180° Sensor, Coil 2/3)
1215 Throttle Position Sensor out of range
1223 Water Temperature Sensor out of range

1224 Air temperature Sensor out of range
2341 Oxygen sensor at limit
2342 Oxygen sensor signal invalid
2343 Mixture setting at limit
2344 Oxygen sensor shorted to ground
2345 Oxygen sensor shorted to 12V
3333 Fan Test in Progress (the fan motor will run intermittently and the 3333 code will flash)
4444 No fault stored

Throttle Position Sensor (TPS) Test:
To test the TPS
Ignition OFF, Ground Pin #3 and monitor Pin #1 with a 12V LED (+lead to Battery + and -lead to Pin#1). Ignition ON, Engine OFF (Pin #3 should remain grounded during this test)
The Test LED will be ON at idle (closed throttle) and OFF just above idle. You should also be able to watch the temperature warning lamp on the tachometer blink ON at idle and OFF just above idle.
Pin #1 should be Low at idle and High just above idle. In other words, if you are measuring from ground to Pin #1 with a voltmeter, Idle should be close to 0 Volts and just above Idle should be close to 12 Volts. (This test also works for Oilheads (1994-2001) with Motronic 2.2 Engine control Units but since there is no temperature warning lamp, you must use either a voltmeter or a Test LED as described above).

NOTE: Measuring the voltage between pins 1 and 4 at the TPS connector should indicate
0.375 Volts at the idle setting (closed throttle) with ignition ON engine OFF.
Snap the throttle open/closed a few times to ensure a consistent reading. To adjust the TPS, loosen the two screws slightly and rotate the TPS until the temperature warning lamp (or the Test LED) 'just' comes ON at idle and goes OFF just above idle. If you are using a voltmeter, adjust the voltage to 0.375 at idle (closed throttle). This voltage MUST remain below 0.400 Volts at idle.

Fan Test:
To test the fan circuits, Ignition ON, Engine OFF, ground pin #1 for 10 seconds. The fan will cycle intermittently and the temperature warning lamp (or the Test LED, if connected) will flash 3333.
This indicates that the fan test is in progress. This test will continue to run until the ignition is switched off.

NOTE: Fan Test for Motronic 2.2 (John from Down Under) adds this:

"Fan Test works on Motronics 2.2"
1. Ignition must be OFF
2. Ground Pin 1
3. Turn ignition ON
4. Count to ten (1 Mississippi, 2 Mississippi,.....)
5. Unground Pin 1
6. Fan will intermittently run until ignition is turned off

ABS-I Fault Codes:
Connect the test LED (+lead to Battery + and -lead to Pin#2)

Ignition ON.
The LED will flash a number of times ONLY if there is a fault code stored. Count these short flashes to determine the ABS fault that is stored in the ABS Control Unit.

Code Fault
1 Front Pressure Modulator
2 Rear Pressure Modulator
3 Front Wheel Speed Sensor
4 Rear Wheel Speed Sensor
5 Low Battery Voltage
6 Large blue ABS Relay in the relay box(Not the smaller blue ABS warning relay)
7 ABS Control Unit Defective
8 Possible Wheel Speed Sensor Gap Fault

ABS-II Fault Codes

Code Fault
3 Front Wheel Speed Sensor
4 Rear Wheel Speed Sensor
5 Low Battery Voltage
6 ABS Relay in ABS Hydro Unit
7 Control Unit (mounted to side of Hydro Unit)
8 External Influence or Wheel Sensor Gap Incorrect
9 Unknown
12 Piston Fault (This can be Mechanical or Electronic in nature)

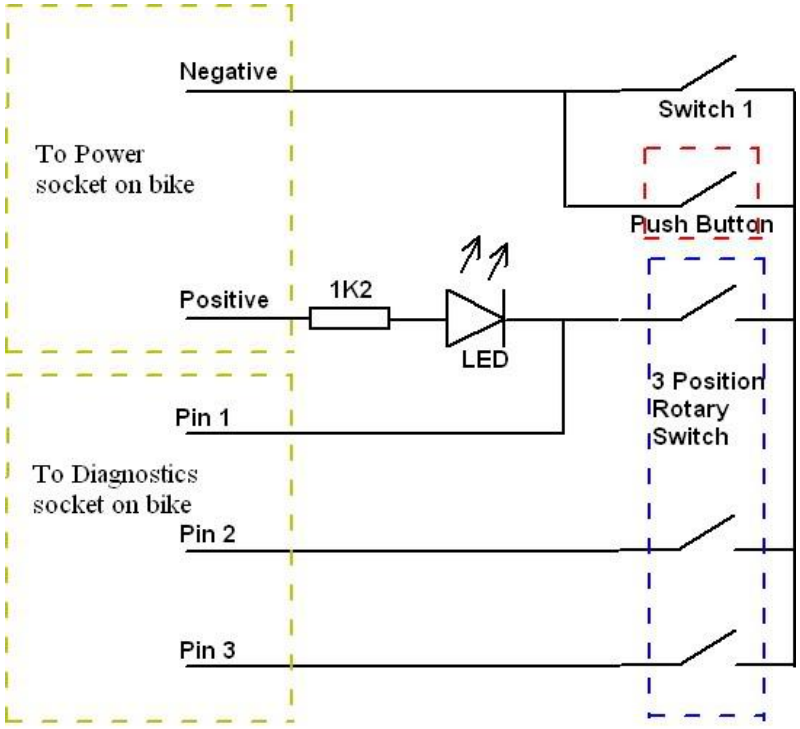
NOTE: Investigate and resolve any ABS fault code discovered with the above procedure BEFORE resetting the fault codes.

Reset ABS Fault
Connect a wire from a good frame ground or battery - to pin #2 of the diagnostic connector.
Press and hold the ABS switch on the dash, turn the Ignition ON while holding the ABS switch depressed for 30 seconds. (Some folks report this works better if you turn on the Ignition and THEN press the ABS switch for 30 seconds. Both methods have worked for me). Release the ABS switch, turn the ignition OFF, remove the ground wire from pin #2. The ABS fault code 'should' now be erased. Go back to the fault code display procedure to ensure there are no more faults stored. Only 1 fault can be displayed at a given time.

ABS-II Low Voltage Fault Fix
To rid your bike of low voltage faults on startup, disconnect the battery. remove the large connector from the ABS Hydro Pump and remove the connector cover. Cut the Green wire that goes to pin #15 about 3" from the connector. Insulate the harness side of this Green wire(it will NOT be used) and connect the pin #15 side to terminal #87 (Green/Blue wire) of the Load-Shed relay (I thread the new wire (at least 23AWG) into the connector with the original harness wires and make the connection 'inside' the connector housing). You can remove the load-shed relay and splice the new wire from

the bottom. This terminal should only have 12V on it with the ignition ON. It should go away during engine cranking.
I would only recommend this modification if you have already installed headlamp relays. Installing the relays WILL increase the light output of your headlamp and ensure that your Hi/Lo switch will last almost forever since all the headlamp current will now be carried by the new relays.
This modification 'might' work without installing headlamp relays but I've only tested it on bikes with the relays installed.

Sugar (OZ Brick rider) has published the schematic to build a cheap and easy 'BMW Test Box'. Here is its schematic:



1x Single Pole Double Throw (SPDT) Switch
1x SPDT Push Button (Optional)
1x Rotary Switch (1 Pole, 3 Position) or
3x SPST switches
1x LED (Any colour)
1x 1K2 Ohms 1/4 Watt Resistor
1x Plastic box to suit
1x BMW Power Plug
3x Pins (Experimentation may be required)
1 Metre of Twinflex cable (Or any light weight cable)
1 Metre of 3 Core cable