

## RealGauge Coolant Gauge Calibration (document ver. 2.3)

RealGauge with software version 2.2 has been enhanced with a coolant gauge calibration feature. One-time use of this feature after installation is recommended on '96-'99 vehicles for improved coolant temperature measuring accuracy. (Note that the oil pressure gauge does not require calibration.) The calibration feature can also be used on '00-'06 vehicles (with rev. 2.0 or later software) for the utmost precision of the coolant gauge, but is normally not necessary.

Two test accessories are required in order to perform RealGauge Coolant temperature calibration:

- Variable resistor with wires and connector pins
- OBDII code reader/scanner with a real time data display feature

The variable resistor is included with all '96-'99 RealGauge kits shipped with Rev 2.0 or later software. (Note that a very small flat blade screwdriver is required to operate the variable resistor).

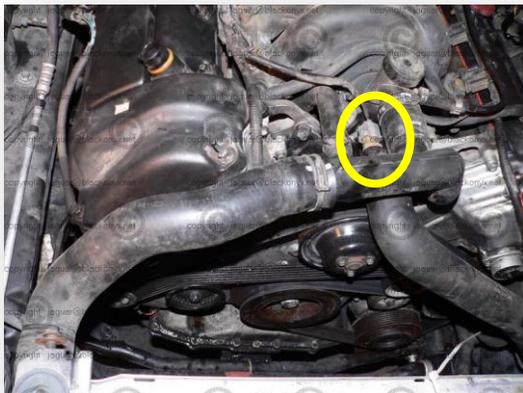
Some XK8/R owners already have OBDII code readers/scanners. For those that do not, one will be provided on loan to RealGauge purchasers by request. Appendix A provides some information on installing and operating the 'ELM327' based USB OBDII code readers/scanners that the TheJagWrangler provides on loan.

### Calibration Procedure

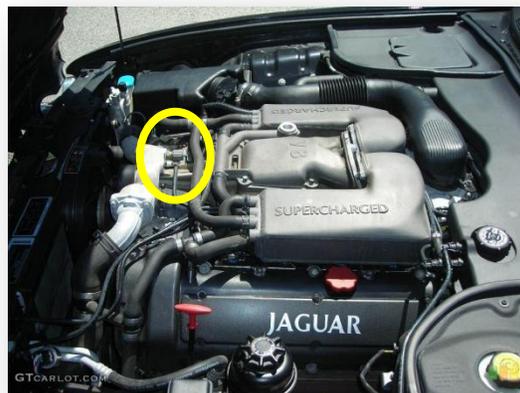
***Before you begin, perform a trial run with your OBDII scanner and make sure you can monitor the coolant temperature successfully. If you are setting up an ELM 327 scanner for the first time, see Appendix A first.***

1. The engine and ignition should be off. Remove the coolant temperature sensor connector (gray connector with two wires) by squeezing the tab and pulling. The coolant temperature sensor connector is located near the top front/center of the engine compartment attached to coolant pipe. See below.

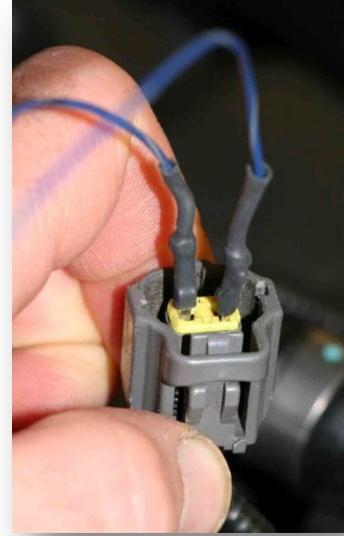
XK8:



XKR:



2. Plug each of the two wires from the variable resistor into a terminal in the coolant temperature connector shell (harness side). Either wire can go in either position. See below.



3. Have a small screwdriver handy to operate the variable resistor.

4. Carefully drape the wires from the variable resistor away from any moving parts on the engine compartment and carry the variable resistor into the passenger seat with you while it is still connected to the vehicle.

5. Turn on the ignition fully, but do not start the engine. Turn off radio, climate fan and lights to conserve your battery. Connect the OBDII reader to the vehicle. (Note: If the OBDII reader is reporting fault codes, please note that P1000 and P1111 are normal codes on a properly operating Jaguar...do not be concerned with these codes). If there are any other codes, deal with them later.

6. Select real time monitoring on your OBDII unit and monitor the coolant temperature.

7. Rotate the variable resistor brass screw about 1/2 turn with a small screwdriver. You should note that the OBDII scanner coolant temperature reading changes. Looking at the brass screw, turning it clockwise will raise the simulated temperature, and turning it counterclockwise will reduce the simulated temperature. Be aware that the radiator fans may cycle on spontaneously as the variable resistor simulates higher temperatures.

If updates on your OBDII scanner are very slow, turn off real time monitors for other functions on your OBDII scanner or in your OBDII software and set it to only monitor the coolant temperature.

8. Follow one of the procedures below, depending on what your gauge tick marks look like:



***If your gauge tick marks look like rectangles***

***follow this instruction:***

Place the RealGauge module in calibration mode by holding down the TRIP cycle button for four seconds, starting the RealGauge test cycle, **and continue to hold the button through the entire test cycle until the test cycle completes and you hear three beeps in a row.** Now release the button immediately after the three beeps. The coolant gauge should now be pointing to the very top of the scale (245 degrees F). **You are now in calibration mode.** Do not press the TRIP button again until directed. Now go to step 9. (**Note:** If the needle is **not** at 245 degrees (or extremely close to it) then follow alternative instruction steps 9 - 13 in Appendix B).



***If your gauge tick marks look like teardrops***

***follow this instruction:***

Place the RealGauge module in calibration mode by holding down the TRIP cycle button for four seconds, starting the RealGauge test cycle, **and continue to hold the button through the entire test cycle until the test cycle completes and you hear three beeps in a row and the needle goes ABOVE the top of the scale. DO NOT release the button yet. Continue holding the button for about another eight seconds until the needle drops to the top of the scale (245 degrees F) and you hear another beep.** Now you can release the button. The coolant gauge should now be pointing to the very top of the scale (245 degrees F). **You are now in calibration mode.** Do not press the TRIP button again until directed. Now go to step 9. (**Note:** If the needle is **not** at 245 degrees (or extremely close to it) then follow alternative instruction steps 9 - 13 in Appendix B).



9. Adjust the variable resistor until the coolant temperature on your OBDII scanner reads 245 degrees F (or as close to it as you can get). Be aware that the radiator fans will cycle on spontaneously. This is normal. Then press and release the trip cycle button **only once**. You will hear a beep. Now the needle on the coolant gauge should have moved to 3/4 scale (215 degrees F).
10. Adjust the variable resistor until the coolant temperature on your OBDII scanner reads 215 degrees F (or as close to it as you can get). Then press and release the trip cycle button **only once**. You will hear a beep. Now the needle on the coolant gauge should have moved to 1/2 scale (185 degrees F).
11. Adjust the variable resistor until the coolant temperature on your OBDII scanner reads 185 degrees F (or as close to it as you can get). Then press and release the trip cycle button **only once**. You will hear a beep. Now the needle on the coolant gauge should have moved to 1/4 scale (155 degrees F).
12. Adjust the variable resistor until the coolant temperature on your OBDII scanner reads 155 degrees F (or as close to it as you can get). Then press and release the trip cycle button **only once**. You will hear a beep. Now the needle on the coolant gauge should have moved to the bottom of the scale (125 degrees F).
13. Adjust the variable resistor until the coolant temperature on your OBDII scanner reads 125 degrees F (or as close to it as you can get). Then press and release the trip cycle button **only once**. **You will now hear three beeps in a row again. This signals that calibration is complete and calibration mode has been exited.**
14. Now verify the calibration. Rotate the variable resistor and observe that the reading on the coolant gauge matches the OBDII scanner readout across the range. (Do not attempt to set temperatures above 245 degrees with the variable resistor as this is beyond the range of the vehicle and the readings may not be correct.) If calibration does not appear to be correct, repeat the calibration process. (Note that the audible over-temperature alarm does not operate because it is suppressed when the engine is not running.) Should you continue to have problems, see the section below on restoring the default calibration and/or contact us for support.
15. Once calibration and verification is complete, the ignition should be turned off. Now remove the variable resistor wires and firmly plug the gray temperature sensor connector back into the sensor.
16. Turn the ignition back on and check for fault codes with the OBDII reader that may have been set during the calibration process. If any were set, reset them. Codes P1000 or P1111 do not need to be reset.
17. Calibration is now complete. Calibration data is stored in non-volatile memory in the RealGauge module and will be retained permanently, even during battery disconnection.

### **Aborting the Calibration process**

If at any time during the calibration process, the ignition is turned off, or the engine is started, the calibration process will be aborted and the default RealGauge calibration will be restored. This is signaled by 5 beeps in a row. If this is ever done unintentionally, the entire calibration process will need to be repeated if the default calibration is not desired.

### **Returning to Default RealGauge Calibration**

If you want to return to the default RealGauge calibration, turn on the ignition fully, but do not start the engine. Enter the calibration mode as described in step 8 above. Then turn off the ignition after you have entered calibration mode, but have not completed the calibration process. This will restore the default RealGauge calibration. This is signaled by 5 beeps in a row. If this is ever done unintentionally, the entire calibration process will need to be repeated if the default calibration is not desired.

## Appendix A - ELM327 USB Code Reader Setup on a Windows 2000 through Windows 7 based PC

1. Install the OBD-II software package of your choice.
  - We suggest EasyOBD-II. Download and install the free version Easy OBD-II from here: <http://easyobdii.com/free-download/index.php>
2. Download and install the latest drivers manually from here: <http://interfusecorp.com/elm327/usb-driver/>
3. Plug your OBDII USB cable into your computer.
4. Identify the COM-Port associated to the device in the Windows Device Manager (or 'Control Panel', 'Hardware', 'View Devices and Printers' in Vista and Windows 7). Look for the device called '**Silicon Labs CP210x USB to UART Bridge**'.
5. Start your vehicle.
  - It may not be required to have your vehicle running, but for first time setup, we suggest this.
6. Connect your ELM327 Interface to the OBD-II adapter in your vehicle.
  - The OBDII plug is located under the dashboard near the driver door.
7. Run the OBD-II software and connect to the interface by selecting the COM-Port associated to the device.
  - If the COM-Port identified in step 5 is set higher than the software allows, you will need to change the COM-Port in the Windows Device Manager by right clicking on properties (or double clicking on the device called '**Silicon Labs CP210x USB to UART Bridge**' in Vista or Windows 7). Select 'General', 'Change Settings', 'Port Settings', 'Advanced'. From here you should see the port setting selection.
8. Go and connect to the vehicle's ECU.
  - Trouble codes and real-time data should now be available to you. Please note that P1000 and P1111 are normal codes on a properly operating Jaguar...do not be concerned with these codes.

## Appendix B - Special case instructions number 9 through 13

In very rare cases, the instrument cluster markings may be out of proper alignment. This is noted by the needle not pointing exactly to the upper (245 F) tick mark after entering calibration mode as described in Step 8.

If you find this is the case, for successful calibration, steps 9 through 13 must be performed differently, as described below:

9. If the needle points **above** the top tick mark (245 F), adjust the variable resistor to read 245 on your OBDII scanner. If the needle points **below** the top tick mark (245 F), read the **actual value\*** off of the scale and adjust the variable resistor to read that same value on your OBDII scanner. (Be aware that the radiator fans may cycle on spontaneously. This is normal.) Then press and release the trip cycle button **only once**. You will hear a beep. Now the needle on the coolant gauge should have moved downwards.

10. Adjust the variable resistor until the coolant temperature on your OBDII scanner reads the **actual value\*** on the scale. Then press and release the trip cycle button **only once**. You will hear a beep. Now the needle on the coolant gauge should have moved downwards.

11. Adjust the variable resistor until the coolant temperature on your OBDII scanner reads the **actual value\*** on the scale. Then press and release the trip cycle button **only once**. You will hear a beep. Now the needle on the coolant gauge should have moved downwards.

12. Adjust the variable resistor until the coolant temperature on your OBDII scanner reads the **actual value\*** on the scale. Then press and release the trip cycle button **only once**. You will hear a beep. Now the needle on the coolant gauge should have moved downwards.

13. If the needle points **below** the lower tick mark (125 F), adjust the variable resistor to read 125 on your OBDII scanner. If the needle points **above** the lower tick mark (125 F), adjust the variable resistor until the coolant temperature on your OBDII scanner reads the **actual value\*** on the scale. Then press and release the trip cycle button **only once**. **You will now hear three beeps in a row again. This signals that calibration is complete and calibration mode has been exited.**

Now return to step 14 of the main instructions.

\*Note that the **actual value** is determined by 245 F at the top of the scale and 125 F at the bottom of the scale with 15 F between each tick mark. The values of the tick marks is therefore from top to bottom: **245, 230, 215, 200, 185, 170, 155, 140, 125**. Estimate the **actual values** between markings to the best of your ability.