


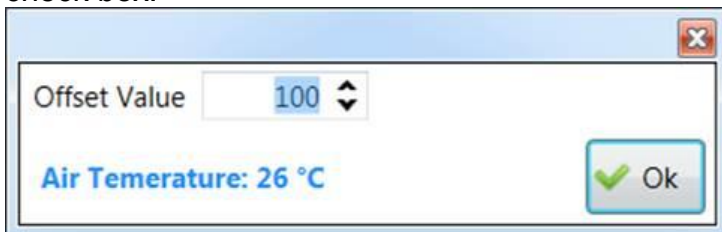
Air Temperature Sensor

Settings and Tuning




The Air temperature sensor is used to compensate with fuel and spark timing for density changes in warm or cold air. Neglecting to wire it in may result in the engine detonating when it is Hot. Not all engines have air temperature sensors mounted on them. Most sensors were incorporated in the MAS meter. This sensor deviates plenty between manufacturers so it is difficult to cater for all manufacturers. However, it can be installed and utilized effectively. Spitronics use a 10K NTC (Negative Temperature Co efficient) resistor. It has a fixed calibration curve which is programmed in the firmware and it cannot be altered. It can however be slightly calibrated by giving it an offset

percentage. The normal setting is 100%. Click on the calibrate  button left of the Air sensor check box.



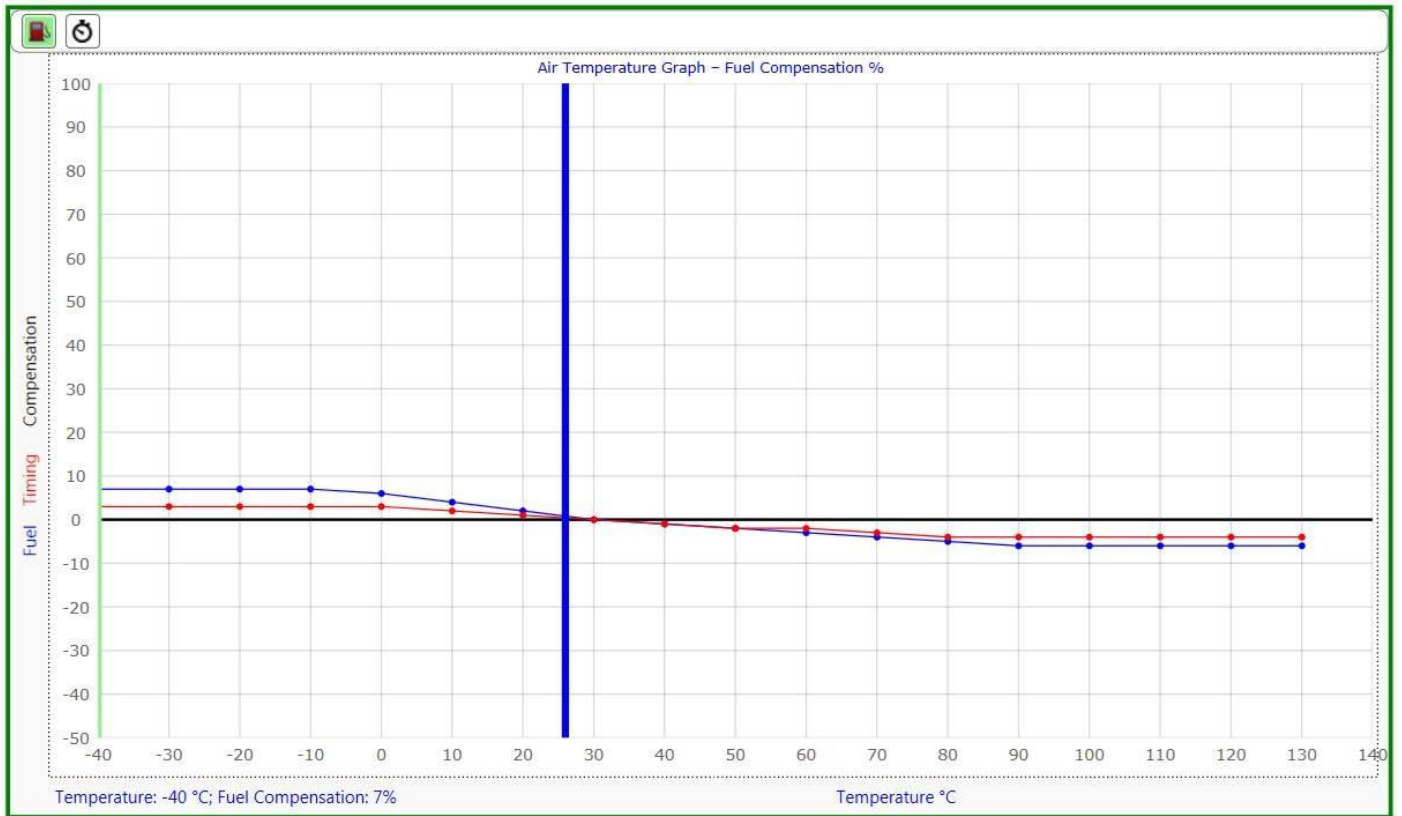
Reduce or increase the value to slightly shift the reading value. Do this at the critical temperature for instance where the engine is at running temperature. If the error is large you may need to replace it or get the correct sensor.

These sensors are measured at 25°C with an ohm meter to see which type it is. If you have the

wrong type you may need to change the sensor to a 10K sensor. *Save to ECU*  button will make the changes permanent.

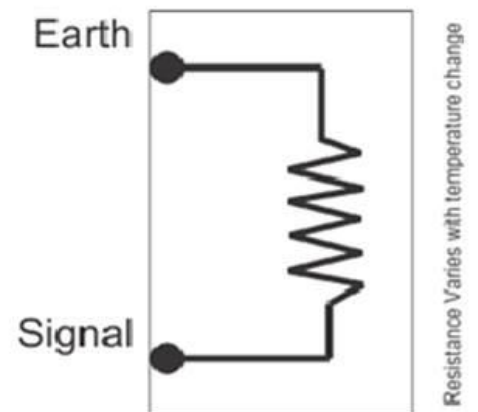
The Air Sensor is difficult to tune as you need controlled environment to do so effectively. Cold air is denser and requires more fuel and timing. You may be required to do adjustment tuning in the winter and then in the summer. The air temperature sensor is situated just before the throttle body (if installed). Remember to enable it on the active sensors page. When the engine is used in the winter, you may advance the timing slightly as the fuel burns at a slower rate. It may even require a richer mixture for these conditions. In the hot summer the engine may tend to detonate as a hot mixture burns more rapidly and the air is thinner. Then you may require to retard the timing slightly and lean out the air-fuel ratio. Remember if you tuned in the winter or summer your graph may tend to slope just on one side.

Air Temperature Graph



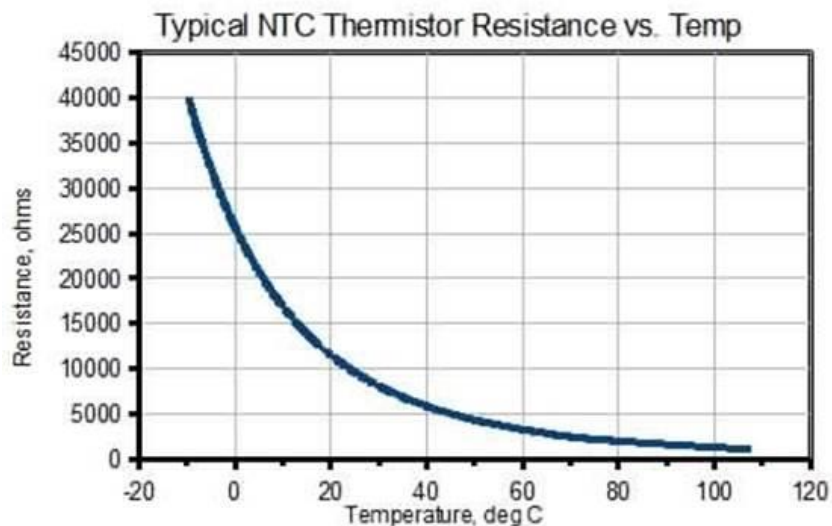
Sensors Description

The air temperature sensor is used by the ECU to correct air density changes due to air temperature variation. This input can also be used for general purpose output controls like Intercooler fans or water spray pumps.



Operation

The resistance of the temperature sensor changes in relation to the temperature it senses. It has a negative temperature resistance co-efficiency, (NTC). Each sensor has a preprogrammed curve to indicate its resistance to temperature. Note that the Spitronics ECU uses a 10K resistance NTC and this value is measured at 25°C .(See below for a sample of such a curve.)



Electronics sensors

Spitronics build and supply small sensors for customers to build into their own units. There are 2 sizes, both do the same work. Note: These sensors requires a pull-up resistor to enable a constant current through them. (See below a picture of what these sensors look like in their raw form.)



How to measure a sensor

Use a multi-meter set to the 20,000 ohm (20 K) range. With the sender unit at approximately 25°C, measure the resistance. It should be between 8000ohm and 12000ohm at 25°C.

Multiple Devices on One Sender Unit

Do not share temperature sender units between two devices. Only one device may be coupled onto a sender unit at any one time. Both devices will excite the sensor with current which in turn will change the signal value and then both will display the wrong temperature. In such a case you may need to add an extra sensor for the Spitronics ECU. The only exception for this rule is when a data logging device is used that has no internal pull up resistor. Example: Race Technology DL1.

Sensor Location

The ideal sensor location is before the butterfly and after the intercooler if turbo charged. Mount away from fuel "stand-off" to avoid the sensor being cooled by the fuel vapor. Use a High Speed Air Temp sensor on turbo applications where the intercooler comes out as temperature varies quickly.

