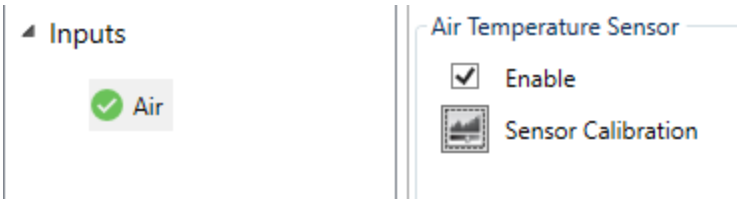
Spitronics - Air Temperature Sensor - Guide

1. Overview

The air temperature sensor is used to compensate fuel and ignition timing for changes in air density due to temperature.



⚠ If the sensor is not connected, the engine may detonate when hot

Not all engines have a dedicated air temperature sensor. In many cases, it is integrated into the MAF/MAS sensor.

Because sensor characteristics vary between manufacturers, compatibility can differ. However, suitable sensors can be installed and used effectively.

👉 Spitronics ECUs use a **10K NTC (Negative Temperature Coefficient) sensor**

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2. Sensor Characteristics

- Type: NTC resistor
- Nominal value: **10 kΩ at 25°C**
- Fixed calibration curve (cannot be changed in firmware)

The reading can be slightly adjusted using a calibration offset.

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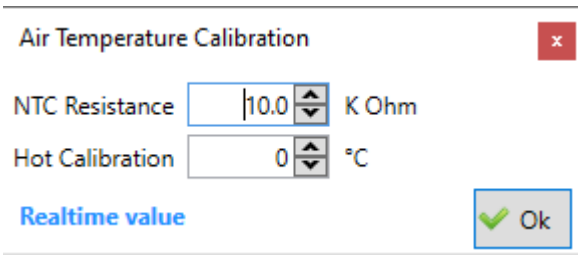
3. Calibration

Click the **Calibrate** button next to the Air Sensor checkbox.



Procedure

- Start with **Hot Calibration** at the default value = 0°C
- If selectable, choose the NTC resistance chart that correlates with your sensor reading
  👉 The software will refresh after each selection to reload the calibration chart
- Bring the engine up to normal operating temperature
- Compare the software reading with the actual sensor temperature

- Adjust the **Hot Temperature** value until the software reading matches the sensor temperature
- Click **OK**, then save the calibration to the ECU

If the Error is Large
- Replace the sensor, or choose a different curve if available
- Use the **10K sensor supplied by Spitronics**

👉 Use **Save to ECU** to make changes permanent

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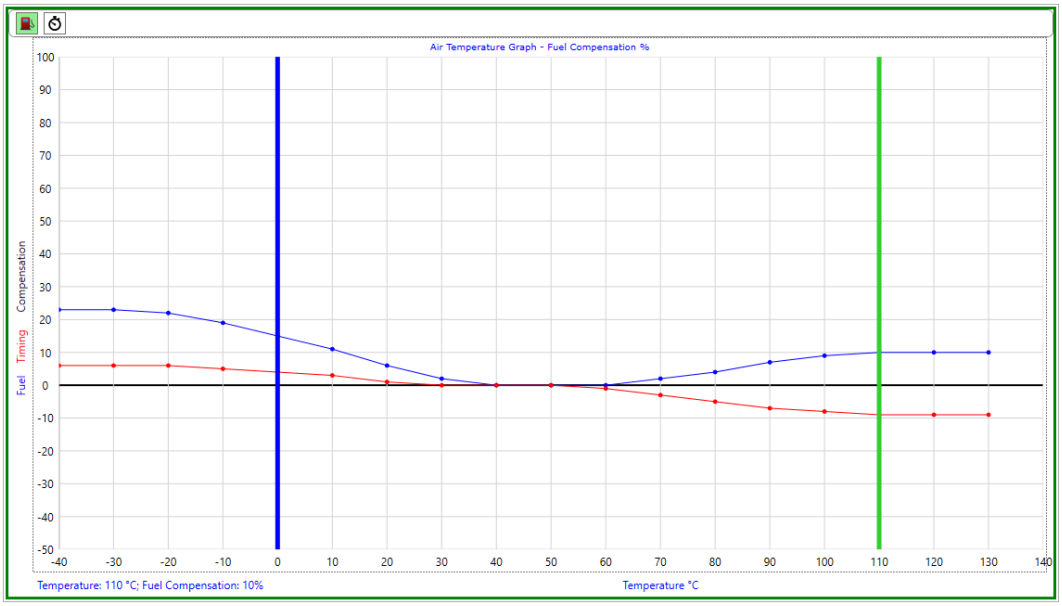
4. Tuning Considerations

Air temperature tuning is difficult and ideally requires a controlled environment.



Cold Conditions
- Air is denser
- Increase fuel
- Slightly advance timing

Hot Conditions
- Air is thinner and burns faster
- Engine may detonate
- Retard timing slightly
- Lean out the mixture if required

⚠ If tuning is done only in winter or summer, the graph may become biased to one side

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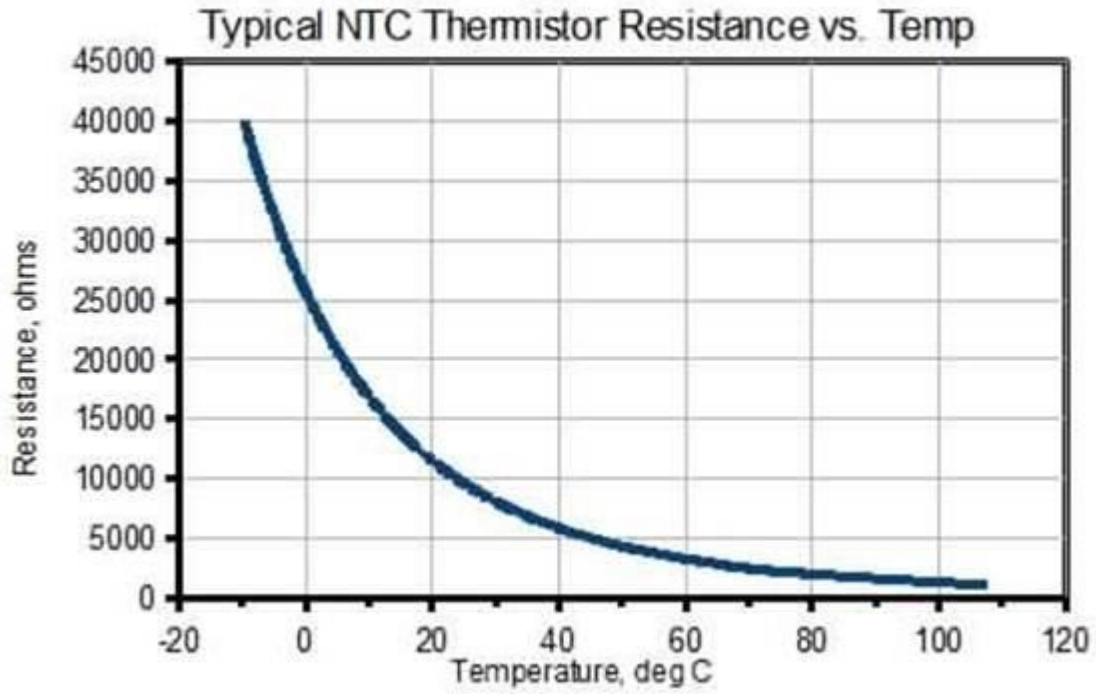
5. Sensor Operation

The sensor resistance changes with temperature.
- Type: NTC (resistance decreases as temperature increases)
- Each sensor has a predefined resistance curve



👉 The Spitronics ECU expects **10K at 25°C**

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6. Measuring the Sensor

Use a multimeter set to the **20 kΩ range**.

1. Measure resistance at approximately 25°C
2. Expected value: **8000–12000 Ω**

👉 If outside this range, the sensor is incorrect or faulty

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7. Sensor Description

The air temperature sensor is used by the ECU to:

- Correct air density calculations
- Adjust fuel and ignition

It can also be used for general-purpose outputs such as:

- Intercooler fans
- Water spray systems

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8. Spitronics Sensors

Spitronics supplies compact sensors for custom installations.

- Available in two sizes
- Same functionality

⚠ These sensors require a **pull-up resistor** for correct operation

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9. Multiple Devices on One Sensor

⚠ Do NOT share a sensor between multiple devices

- Each device applies current
- This alters the signal
- Results in incorrect readings

👉 Use a separate sensor for each device

Exception:
Data logging devices without internal pull-up resistors (e.g. Race Technology DL1)

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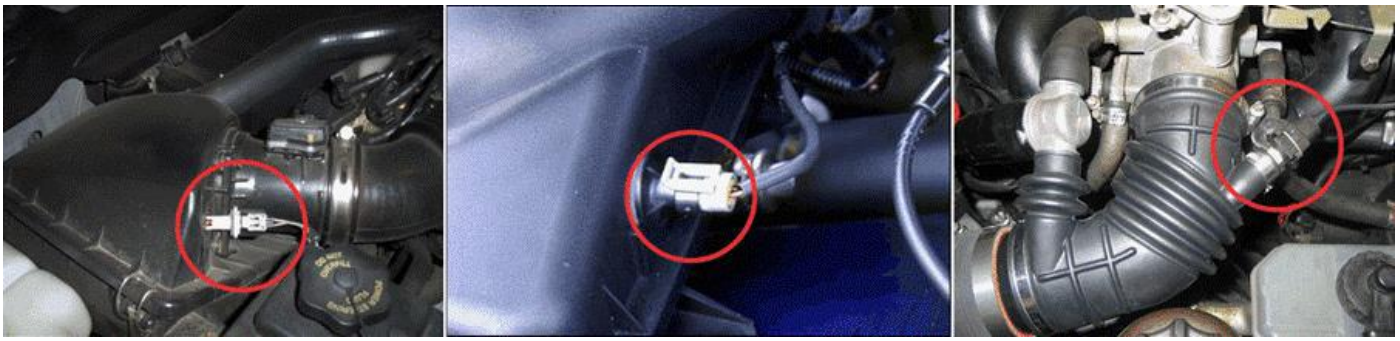
10. Sensor Location

👉 Ideal location:

- Before the throttle body
- After the intercooler (turbo applications)

Multiple Sensors Example



Avoid:

- Fuel stand-off areas
  👉 Fuel vapour can cool the sensor and give incorrect readings

Turbo Applications

👉 Use a **high-speed air temperature sensor**

- Required due to rapid temperature changes after the intercooler

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💡 Notes

- Always enable the sensor in the **Active Sensors** page
- Incorrect sensor type will result in incorrect tuning
- Always verify resistance before installation