

Noise Reduction with Scion Thermal Conductivity Detector

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Thermal Conductivity Detector (TCD) is a common detector in gas chromatography, as it can measure many analytes not including the carrier gas. A distinct feature of this detector is the ability to monitor high concentrations of bulk materials, such as all components on natural gas. However, its primary disadvantage is its inherent sensitivity limitations, due to noise restrictions. Concentrations down to low ppmV levels start to diminish. Thermal Conductivity Detector filaments, mounted inside, tend to wobble from exterior shaking. One source is an imbalanced column oven fan motor, mandated to control the column temperature.

One cure is to mechanically isolate the detector from the instrument chassis with 1" glass wool inserted under the detector and undo all attachment screws, including inside column oven at top. Figure 1 illustrates the effects. By reducing noise without affecting peak responses, lower concentrations can be measured.

Turning off the column oven fan is an easy solution to eliminate vibrations caused by the fan, but will cause the GC to:

- not come to ready
- not maintain its column temperature setpoint

One approach to dampen the vibrations from column oven fan motor to insert glass wool Insulation under detector, Figure 2. (McMaster-Carr P/N 9356K11, www.mcmaster.com/products/glass-wool/fiberglass-insulation-sheets/).¹

Noise is reduced by factor of 8.7.

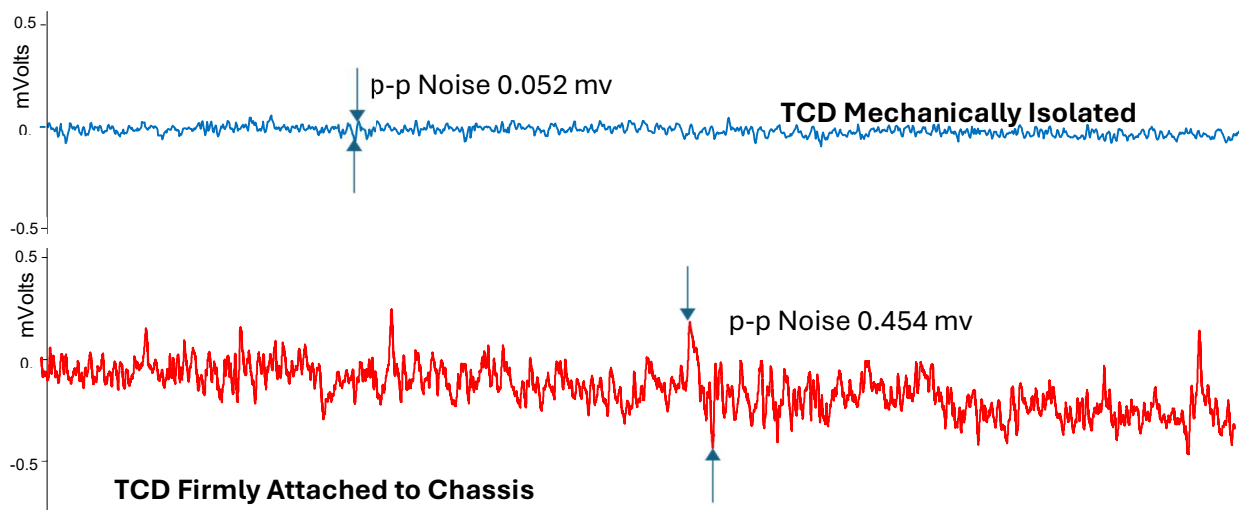


Figure 1. Peak-to-peak noise levels generated with and without detector attachment to chassis. Instrument settings listed in Table 1.

¹ Insulation trimmed for Scion Instruments TCD is available from Lotus Consulting (Part Number: TCD INSULATION) at US\$75, including US ground shipping.

Table 1. Instrument Settings

Instrument Settings	
Detector Temperature	150 °C
Filament Temperature	350 °C
Range	0.05
Data Rate	5 Hz
Carrier Gas	Argon
Reference Flow	30 ml/min
Makeup Flow	30 ml/min



Figure 2. Photo of one approach to disengage Thermal Conductivity Detector from vibrations generated by imbalanced column oven fan motor and transmitted by the instrument chassis. Thermal Conductivity Detector box is tilted back to expose insulation inserted under the detector to effectively suppress the interfering vibrations.

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