

K-Type Thermocouple Adaptor & Probe

(Product No 3105)

Range: -200°C to 1,000°C

Resolution: 1°C

This product includes both a *Smart Q* Thermocouple adaptor and a 'Type K' thermocouple.



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Introduction

The Thermocouple Adapter

The *Smart Q* Thermocouple Adapter is equipped with a micro controller that greatly improves the accuracy, precision and consistency of readings by using a 40-point linearisation of the Thermocouple characteristic. They are supplied calibrated and the stored calibration (in °C) is automatically loaded when the Thermocouple Adapter is connected.

The 'Type K' Thermocouple

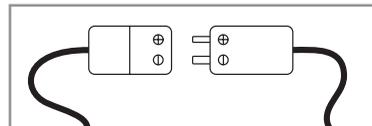
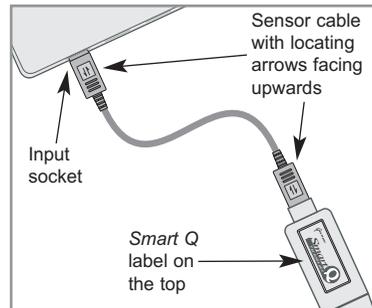
The thermocouple junction is housed at the end of the 200 x 3mm AISI 310 stainless steel sheath.

It has a one metre long cable that terminates in a mini plug (colour coded green to indicate thermocouple 'type K').

Replacement thermocouples are available from Data Harvest – Product No 3107.

Connecting

- Hold the Thermocouple Adapter with the *Smart Q* label showing on the **top**.
- Push one end of the sensor cable (supplied with the *EasySense* unit) into the socket on the adaptor with the locating arrow on the cable facing upwards.
- Connect the other end of the sensor cable to the Input socket on the *EasySense* unit (with the locating arrow facing upwards)
- Connect the mini plug on the thermocouple to the socket that leads from the adapter by matching the positive and negative symbols (the thinner leg is positive)



Theory

The simplest thermocouple has two wires made of different metal alloys (nickel chromium (+) and nickel aluminium (-) in type K). When the ends of these two different wires are connected or twisted together, if one end is heated or cooled while the other end remains at a constant temperature, a small potential or voltage is created. This small voltage difference is called the Seebeck Effect; it is amplified and used as a way of measuring temperature difference.

Sensor Information

The Thermocouple Adaptor can be used with other types of 'K type' thermocouples. If so, then limit the temperature range to that of the thermocouple attached e.g. a welded tip PTFE insulated 'K' type thermocouple can have a range of only -50°C to $+200^{\circ}\text{C}$.

The old colour codes for thermocouples are being phased out and have been replaced with a new specification code, IEC 584-3 (for international use). The present IEC colour code for a 'K' type thermocouple is green.

The metal sheath of the type K thermocouple can withstand temperatures above $1,000^{\circ}\text{C}$. However, the PVC insulation on the connecting cable has a working range of -10°C to 105°C , so keep this cable away from the source of heat e.g. by clamping the Sensor in position. Stainless steel 310 was selected as the material for the sheath for its properties as a poor conductor.

The thermocouple junction is insulated from the stainless steel sheath. If un-insulated thermocouples are used, they must be insulated from each other or incorrect readings will result.

The Thermocouple Adaptor has a micropower thermocouple cold junction compensator.

Carbon deposits are best wiped off using a dry cloth.

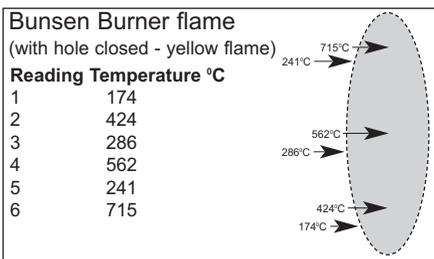
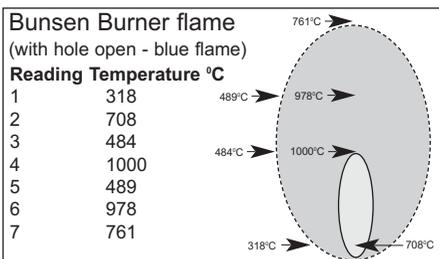
When working from high to lower temperatures, allow the Sensor time to cool and stabilize before taking a new reading.

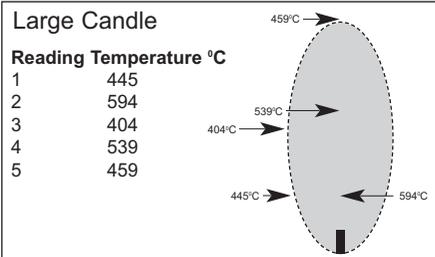
SAFETY ISSUES:

- ! Do not plunge the thermocouple into cold water when it is very hot.**
- ! Allow the thermocouple to cool before handling.**

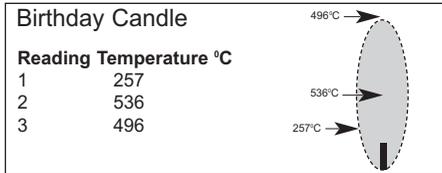
Investigations

- *How the temperature inside a Bunsen flame varies with position.*





These results were obtained using Snapshot mode. The Copy Table option in Edit has been used to copy the table into a word processing application.



- Comparing the temperature of different flames i.e. candles v bunsen burner.
- Investigating whether wax type in candles affects the rate of combustion.
- Discovering at what temperature popcorn pops – evaluating poppers and varieties of popping corn.
- Melting point of copper, bismuth or other solids.
- Temperature of dry ice or liquid air.

Warranty

All Data Harvest Sensors are warranted to be free from defects in materials and workmanship for a period of 12 months from date of purchase provided they have been used in accordance with any instructions, under normal laboratory conditions. This warranty does not apply if the Sensor has been damaged by accident or misuse.

In the event of a fault developing within the 12-month period, the Sensor must be returned to Data Harvest for repair or replacement at no expense to the user other than postal charges.

Note: Data Harvest products are designed for **educational** use and are not intended for use in industrial, medical or commercial applications.



WEEE (Waste Electrical and Electronic Equipment) Legislation. Data Harvest Group Limited are fully compliant with WEEE legislation and are pleased to provide a disposal service for any of our products when their life expires. Simply return them to us clearly identified as 'life expired' and we will dispose of them for you.