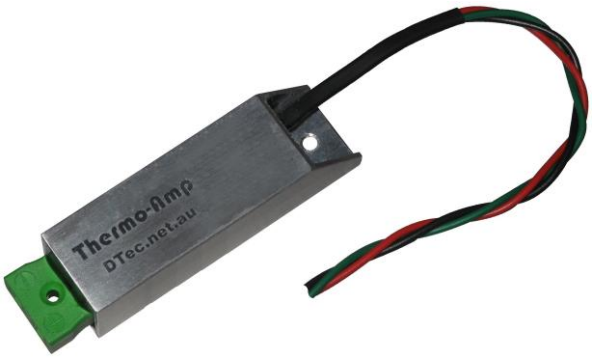
Thermo-Amp
'K' Type Thermocouple Amplifier

Specifications –



Applicable sensor:
'K' type with standard 'miniature' style connector

Linear voltage output:
10mV/deg Celsius

Range:
0ºC to 1250ºC

Dimensions:
Case (body + connector)- 82mm x 19mm x 19mm (3.3" x 0.7" x 0.7")

Wiring:

Red	+ve power (5V to 18V) Supply voltage must be greater than maximum required output voltage
Black	-ve ground
Green	Output voltage
Blue	Output voltage (Filtered output)

Wiring DTec's 'Thermo-Amp' thermocouple amplifier –

Thermocouples only produce tiny voltages so these are greatly amplified before use. This means they are very sensitive to electrical noise also being amplified. Thermo-Amp takes measures to prevent this, but care is still needed to get quality data. Avoid running near ignition system wiring and it is greatly preferable to use 'isolated' sensors, these do not contact the earth (ground) of the vehicle and therefore connect only to Thermo-Amp directly. Particularly when using 'spark plug washer' type sensor probes interference may occur if they are grounded and not isolated type.

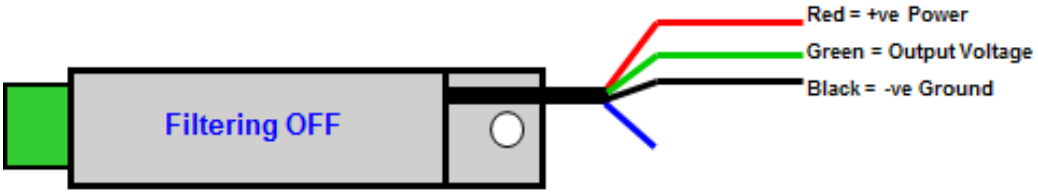
Powering of 'Thermo-Amp' for high temperatures –

For Thermo-Amp to read to 1200ºC the sensor supply will need to be 12V or greater as the output is 10mV per ºC. For measuring temperatures < 500 ºC then a 5V power supply is fine.

Selecting the operating mode of 'Thermo-Amp' –

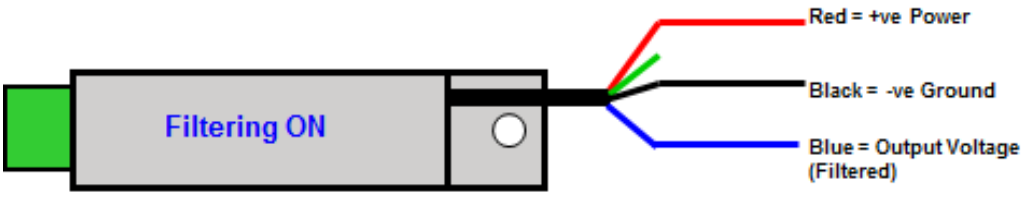
Using either the Green or Blue wires as an output selects the filtering characteristics.

Note: Suggested connection is Mode 1 (unfiltered)



Default- Green wire used for output (unfiltered)

Mode 1) 10mV per ºC output, Hi current (low impedance)



Blue wire used for output (filtered)

Mode 2) 10mV per ºC output, with electrical noise filtering

Filtering of electrical noise –

Thermo-Amp is designed to be as universal in use as possible; therefore it requires exceptional internal filtering to suppress interference and help improve measurement quality. Electrical noise can come from many sources, particularly vehicle ignition systems.

If your output is varying wildly you may need to select Mode2 for 'noise' filtering, this is often necessary when taking measurements near ignition systems, particularly of the CDI type found on many small engines.

A side effect of selecting this noise filtering is that in extremely rare cases it is possible that the output may be seen to repeatedly and slowly read high and low (slowly oscillating), this effect depends on the input design of the measuring equipment you have connected, if observed then simply select an unfiltered mode.

Interfacing to equipment with poor (low) input impedance –

If you are connecting to equipment with very low input impedance (meaning it 'loads down' inputs) then it may result in the output of Thermo-amp being 'pulled down', resulting in a slightly lower temperature reading than expected.

To prevent this, Mode1 provides a Hi current source (low impedance) to drive this equipment for improved accuracy.

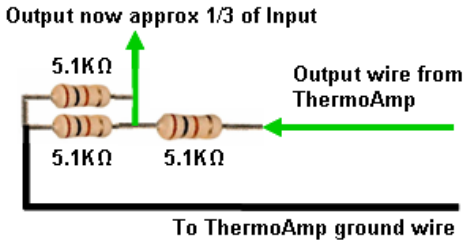
Mode 1 is recommended to use whenever possible and is the default Mode.

Changing from the default voltage output range of 10mV per ºC –

When reading the output voltage, ensure your measuring equipment can handle the peak voltage expected at your max temperature.

However, if you wish to interface to equipment (e.g. some data loggers) that only accept 5V Max inputs then you will be limited to measuring < 500 ºC, unless the output voltage is 'scaled down' to suit.

You can easily scale the output down to 3.33mV/ ºC (effectively dividing the output by approx 1/3) using 3 resistors of the same value, therefore a temperature of 1500ºC would = 5V (as oppose to 15V)



Use in harsh environments –

Thermo-Amp has sealed (potted) electronics; however, it is not designed to be exposed directly to fluids. Fluids may enter via the connector or cable so take care to avoid exposure.

Field calibration –

For an easy field calibration/test if required, immerse the sensor probe in boiling water (100 ºC) and later in a crushed ice bath (0 ºC) to measure the error and apply an offset to your collected data if necessary. This method can be used with DTec's 'DYNertia3' to provide the calibration data for increased accuracy in the lower temperature ranges.

Operation with 'DYNertia3' software –

Thermo-Amp has already been configured as a sensor in DYNertia3 software; you only need to select the calibration range/units from the list. Please see the DYNertia3 manual chapter "Inputs- using" section titled "Sensor Configuration" for details on selection and any further calibration.