



Product Specification

Document Number	PSAU0026	
Title	Thermocouple Amplifier	
Revision Date	Prepared By	Approved By
13/7/03	Tony Whitfort	

MoTeC Thermocouple Amplifier - Specifications

Thermocouple Type

Type: K, Isolated or Non Isolated.

Note: For non isolated sensors the sensor voltage must be within the amplifiers common mode range (see input characteristics). This often occurs in vehicles where the thermocouple is connected to the vehicle chassis potential and the amplifier is connected to an electronic device that has a 0V reference voltage that is above chassis potential due to voltage drop in the power wiring.

Calibration Table

Because thermocouples have nonlinear characteristics it is best to use a calibration table to relate the output voltage and temperature. The following table should be used. Note that using a linear calibration rather than a calibration table can result in errors of up to 20°C

Temp °C	Temp °F	MoTeC Thermocouple Amp Nominal Output Voltage (Volts)
0	32	0.000
50	122	0.196
100	212	0.397
200	392	0.788
300	572	1.183
400	752	1.589
500	932	2.000
600	1112	2.413
700	1292	2.822
800	1472	3.225
900	1652	3.617
1000	1832	4.000
1100	2012	4.371
1200	2192	4.731
1250	2282	4.906

Accuracy

Conditions: 25°C ambient and 25°C measured

Calibration Error: ± 3°C

Gain Error: ± 0.5% max

Temp Drift: ± 0.05 °C / °C max (over 0 to 50°C ambient)

Total Errors

(Calibration + Gain + Temp Drift) for 0°C to 50°C ambient

At measured temp of 25°C, Total error ± 4.25°C

At measured temp of 1000°C, Total error ± 9.25°C

Cold Junction Compensation

Cold junction compensated is performed at the thermocouple connector.

Note: The thermocouple must be connected using K Type Thermocouple wire or K Type compensating wire all the way to the amplifiers connector (there must be no copper wire in-between).

Input Characteristics

Common Mode Voltage Range: -5V to +2.5V

Input Impedance: Negative Input 100kohm to 0V

Input Impedance: Positive input >1Mohm to 0V

Output Characteristics

Normal Operation:

Maximum Sink Current: 5mA (0 to 5V output)

Maximum Source Current : 5mA (0 to 4.2V output), 2mA (4.2 to 5V Output),

Absolute Maximum:

Output Sink Current: 5mA max

Output Source Current: Current limited, Protected against continuous short to 0V

Applied Output Voltage: 0V, 5.0Vmax. Voltages outside these limits may cause damage.

Driven Output Voltage: -0.3Vmin, 5.3Vmax. (no load)

Power Supply

Supply Current: 1mA typical (plus output drive current)

Supply Voltage :

- Recommended Voltage: 8V Regulated
- Operational Voltage Range: 7.5VDC min, 22VDC max
- If connected to a 12V vehicle battery then the connection should be made near a device that includes transient voltage clamping of 60V or less.
- Maximum Reverse Voltage: -20V
- Max Transient Supply Voltage: 60V for <100ms at <1%duty

Environmental

Operating Temp Range: -10°C to 80°C ambient

Environmental Protection: IP53 (with connector facing down)