

5B37 Transfer Function

Calculating the Output Voltage of a 5B37 Signal Conditioner

The output voltage of a 5B37 thermocouple signal conditioner can be calculated by knowing: (a) the thermocouple input voltage at the measurement temperature; (b) the thermocouple input signal at the minimum point of the 5B37 module temperature range; and (c) the 5B37 gain.

Transfer Equation for 5B37

To determine the output voltage from a 5B37 module, use the following equation:

$$V_{OUT} = (TC\ Output - V_{ZERO}) \times GAIN$$

where,

1. V_{OUT} is the 5B37 module output (in volts).
2. $TC\ Output$ is the thermocouple output voltage (in mV) at the temperature being measured.
3. V_{ZERO} is the thermocouple output voltage (in mV) at the minimum temperature span specified for the 5B37 module.
4. $GAIN$ is the throughput gain (in V/mV) of the 5B37 module.

Table I provides the thermocouple output voltage at the minimum temperature span of each 5B37 module (V_{ZERO}) and the 5B37 gain.

Sensors Software Program

For assistance in determining a specific thermocouple output voltage at any temperature, you may contact Analog Devices, Inc., and request a copy of the SENSORS software program. Alternatively, you may download this program from the Analog Devices World Wide Web Site. This Windows® 3.1, 95, NT software program provides a convenient reference to look up tables of temperature sensing devices, including thermocouples, RTDs (Platinum, Nickel and Copper), as well as thermistors. Functions are implemented in both directions (i.e., temperature-to-mV and mV-to-temperature), as well as in both °C and °F.

Table I. Transfer Functions for Model 5B37 Thermocouple Signal Conditioner

Parameter	5B37-J-01	5B37-K-02	5B37-T-03	5B37-E-04	5B37-R-05	5B37-S-05	5B37-B-06	5B37-N-08
Temp (°C) Low Range	-100	-100	-100	0	0	0	0	0
Temp (°C) High Range	760	1350	400	900	1750	1750	1800	1300
V_{OUT} (V) Low Range	0	0	0	0	0	0	0	0
V_{OUT} (V) High Range	5	5	5	5	5	5	5	5
V_{IN} (mV) Low Range	-4.632	-3.553	-3.378	0	0	0	0	0
V_{IN} (mV) High Range	42.922	54.125	20.869	68.783	20.878	18.504	13.585	47.502
V_{IN} Span (mV)	47.554	57.678	24.247	68.783	20.878	18.504	13.585	47.502
Gain (V/mV)	0.105143	0.086688	0.206211	0.072692	0.239486	0.270211	0.368052	0.105258
V_{ZERO} (mV)	4.632	-3.553	-3.378	0	0	0	0	0