



- Precise compensation for type E, J, K, and T thermocouples
- Signal isolated from compensation power
- Use any instrumentation amplifier
- No batteries required
- Eliminate long-distance thermocouple wire



# T/CMate™

## THERMOCOUPLE COLD-JUNCTION COMPENSATOR

### Series 200



Actual size



The Ectron T/CMate Series 200 Thermocouple Cold-junction Compensator allows any following instrumentation amplifier to be used as a thermocouple amplifier with thermocouple input. Ectron conditioner-amplifiers are ideal.

The T/CMate accepts thermocouple signals, provides precision cold-junction compensation to copper wires, and adapts the signal for amplification. A jumper allows selection of the appropriate compensation for four thermocouple types.

A unique optical isolator provides power for the compensation circuitry from any 5 to 15 volt dc power source, eliminating the need for batteries. The strain-gage excitation supply available from Ectron conditioner-amplifiers provides ideal power. When connecting to computer I/O cards, the computer's 5-V or 12-V supply voltages can be used.

## Operation

When thermocouple signals are amplified or converted to digital signals the T/C wires must first be connected to copper wires (amplifiers using T/C wires haven't yet been invented). Where the T/C to copper wires connect, unwanted T/C junctions are formed. To avoid these errors a "Cold Junction Compensator" (CJC) must be used.

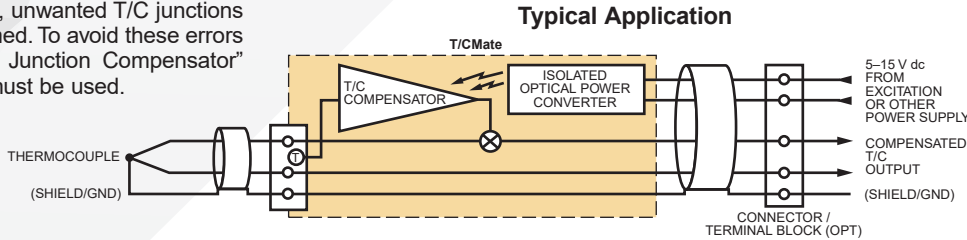
Historically, CJC devices have taken several forms:

1. An ice bath (slurry of pure water and ice).
2. A thermoelectrically cooled chamber.
3. A battery-powered bridge network that includes temperature correction.

The Ectron T/CMate is similar to Type 3, but instead of a battery almost any nonisolated power supply from 5 to 15 V can be used. Within the T/CMate isolation between the low-level T/C signals and the power supply voltage is extremely high. Any number of T/CMate's can be powered

by a single power supply.

The T/CMate does not linearize the signal. Linearization to match thermocouple conversion characteristics is most accurately accomplished by a computer following a linear analog amplification of the actual thermocouple output.



Jumper block at right selects type E, J, K, or T thermocouple. The toggle switch at left can be switched to the ZERO position to provide a shorted output for amplifier zero adjustment.

## Specifications

**Thermocouple types:** E, J, K, and T selectable by use of plug jumper.

### Input Thermocouple

**Connection:** Two thermocouple wires plus shield attach to a terminal block assembly.

**Dc Power:** 5 to 15 V dc regulated at 50 mA nominal, usually supplied by the amplifier's excitation supply but can be any supply.

**Isolation Between Signal and Input Power:** 100 MΩ and 75 pF. Breakdown voltage ±300 volts.

**Accuracy (including ambient variation of 25°C ±25°C):** Better than ±1°C for all thermocouple types.

**Reference Temperature:** 0°C (32°F)

**Zero/Operate Switch:** A toggle switch shorts the compensated T/C output to simplify zero adjustment of the following amplifier.

**Size:** 30 mm H x 30 mm W x 51 mm L (1.15" H x 1.15" W x 2.005" L) plus 165 mm (6.5") cable.

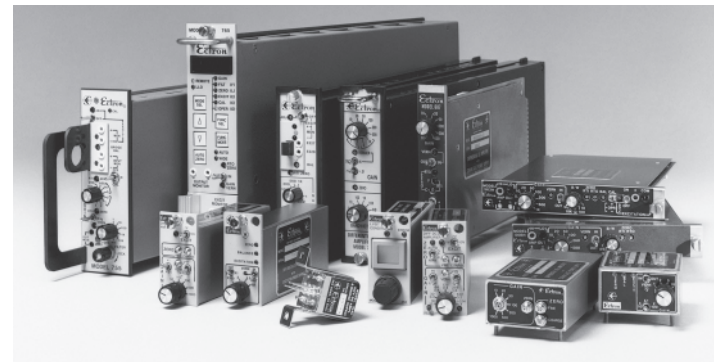
**Weight:** 65 g (2.3 oz) plus connector if installed.

**Output:** Standard output for the Model 200 is a 165 mm (6.5") cable with wires for the compensated T/C output signal plus two leads for input power. Also available are versions with connectors on the cable: Model 201 has a PT06A-10-6P[SR] connector to mate with the input connectors on the Ectron Models E408-6, R408-14, E513-6A and R513-16 enclosures. WK-5, MS, and other connector versions to mate with other enclosures are available.

## Ectron Transducer Conditioner-Amplifiers

Ectron Corporation offers a broad line of transducer conditioner-amplifiers to meet many measurement needs in widely varying environments. The extreme stability and low noise inherent in these amplifiers makes them ideal for temperature measurement in conjunction with a T/CMate.

Ectron conditioner-amplifier models suitable for T/CMate operation are: 314B, 350 Series, 414 (except T414), 416, 418 (except T418), 428, 563H, 540, 680 Series, 753A, 755, 765, 776, 778.



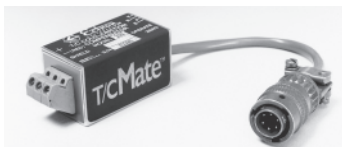
## Thermocouple Simulator/Calibrators

Ectron thermocouple simulators are the industry standards for thermocouple instrument calibration. The microprocessor-based Model 1140A (shown) effectively eliminates conformity errors by utilizing polynomial transformation to convert

temperatures into an exact equivalent thermocouple emf.



Standard T/CMate Model 200 has 165 mm (6.5") cable with soldered ends for terminal block or other connection.



T/CMate Model 201 includes a PT06A-10-6P[SR] connector to mate with Ectron enclosures. WK-5, MS, and other connectors are also available.



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