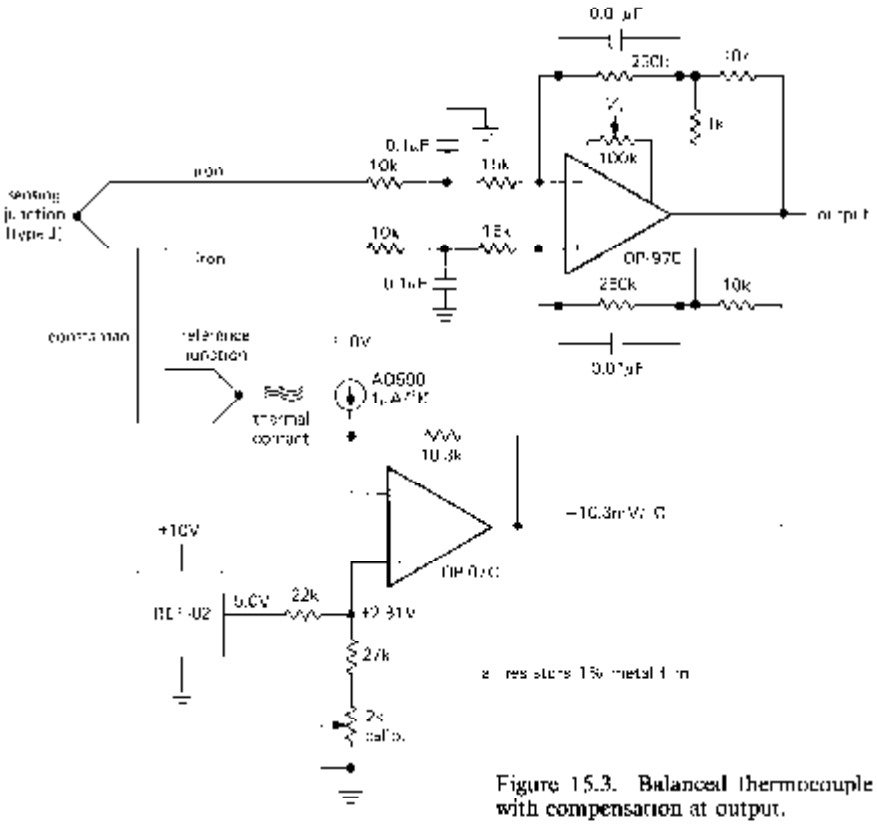

Figure 15.3. Balanced thermocouple amplifier with compensation at output.

offset current of 0.1nA (max) contributes 25µV of input error, which, along with the 25µV (max) of V_{os}, can be trimmed to zero. Alternatively, one could use a chopper-stabilized op-amp like the 7652 (V_{os} =5µV max, I_{os} = 40pA max).

An instrumentation amplifier, as in Figure 7.32, could be used instead of the differencing amplifier we've shown; in that case be sure to provide a dc bias path at the input.

Thermocouple users should be aware of Analog Devices' "thermocouple amplifier with cold junction compensation," the AD594 (type J) and AD595 (type K). These monolithic devices have everything you need (including an ice-point reference) to produce a temperature-proportional output voltage, or even programmable trip point, given a thermocouple input. The best grade is accurate (without trimming) to ±1°C at room temperature, increasing to ±3°C at −25°C and +75°C. Linear Technology makes the LT1025 "micropower thermocouple cold-junction compensator," designed to be used with an external precision op-amp. It includes compensation for all thermocouples in Table 15.1 (except type B), with second-order curvature correction to maintain accuracy over a wider temperature range. The best grade (LT1025A) is accurate (without trimming) to ±0.5°C at room temperature, increasing to ±2°C at −25°C and +80°C.

Complete "smart" temperature-measuring instruments configured for various thermocouple pairs are available commercially. These instruments include computational