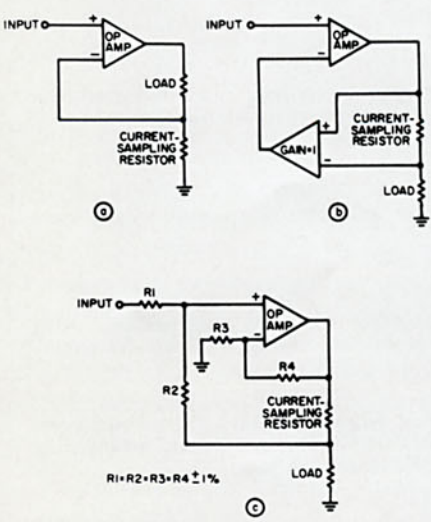
Grounded-load current source uses one operational amplifier

James M. Loe,
Communications & Electronics Div.,
Philco-Ford Corp., Blue Bell, Pa.

A frequent need is for a current source as part of a subsystem. The classical approach to a high-quality current source is to use an operational amplifier connected as in Fig. 1a.

In this figure the load is floating. When, however, a grounded load (one side grounded) is required, two operational amplifiers are usually connected as in Fig. 1b. Here the current-sampling resistor is floating. This necessitates a differential signal pick-off amplifier with gain of 1.



Grounded-load current source can be made with only one operational amplifier (c). In the standard circuit (a) the load floats, while (b) uses two amplifiers.

Figure 1c shows how a grounded-load current source can be obtained with just one operational amplifier. The differential input capability of the single amplifier is exploited by resistive positive and negative feedback networks. For high output impedance, network resistors *R1, R2, R3,* and *R4* must be equal to each other within ±1%.

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