

284J AS A CURRENT-LOOP RECEIVER

Isolated 4-20mA Analog Interfacing Low-Cost Protection from kV Spikes

by Jim Maxwell

The 284J Isolation Amplifier*, announced in the last issue of this Journal, provides a key to measuring analog quantities transmitted via 4-20mA current loops over substantial distances through harsh environments with reasonable accuracies and high common-mode rejection. Both the amplifier and the circuitry that its output serves are protected from kV-level common-mode transients.

Figure 1 shows a typical application of the 284J in such circuitry. A 37.5Ω resistor converts the 4-20mA current input from a remote loop to a 150-750mV differential voltage input, which the 284J amplifies, isolates, and translates to a 0 to +5V output level at local system ground.

Among the most-helpful characteristics of the 284J in this kind of measurement are the high common-mode rejection (110dB minimum at 60Hz with 5kΩ source unbalance) and the high common-mode rating (± 2500 volts dc). The former means low noise pickup; the latter means excellent isolation and protection against large transients. The high common-mode rejection, permitting relatively low input voltage to be used (0.5V span, in this case), permits the use of a low current-metering resistance, which in turn results in low compliance-voltage loading on the current loop, and therefore permits insertion into existing loops without encountering overrange problems. The gain of 10 provides a substantial 5V output span, and the floating output permits biasing to a 0 to 5V range. Earlier models 275J/K/L* could be used in this application (and would be necessary if linearity error as low as 0.05% were required), But, if 0.3% is adequate, considerable cost savings are available (284J: \$59, 1-24; \$41, 100+).

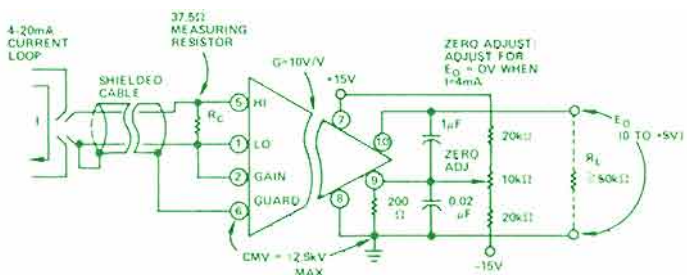


Figure 1. Isolated analog interface; 4 to 20mA is converted to 0 to +5V at the output, with up to ± 2500 V of isolation.

*For technical data on these products, use the reply card.