



# Precision, Wide Bandwidth, Synchronized Isolation Amplifier

## Model 289

### FEATURES

**Low Nonlinearity:**  $\pm 0.012\%$  max (289L)

**Frequency Response:** (-3dB) dc to 20kHz

(Full Power) dc to 5kHz

**Gain Adjustable** 1 to 100V/V, Single Resistor

**3-Port Isolation:**  $\pm 2500\text{V}$  CMV Isolation Input/Output

**Low Gain Drift:**  $\pm 0.005\%/^{\circ}\text{C}$  max

**Floating Power Output:**  $\pm 15\text{V}$  @  $\pm 5\text{mA}$

**120dB CMR at 60Hz:** Fully Shielded Input Stage

**Meets UL Std. 544 Leakage:**  $2\mu\text{A}$  rms max, @ 115V ac, 60Hz

### APPLICATIONS

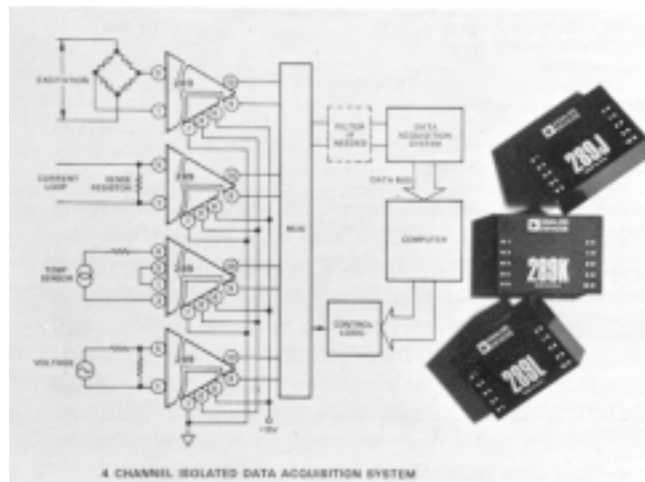
**Multi-Channel Data Acquisition Systems**

**Current Shunt Measurements**

**Process Signal Isolator**

**High Voltage Instrumentation Amplifier**

**SCR Motor Control**



### GENERAL DESCRIPTION

Model 289 is a wide-band, accurate, low cost isolation amplifier designed for instrumentation and industrial applications. Three accuracy selections are available offering guaranteed gain nonlinearity error at 10V p-p output:  $\pm 0.012\%$  max (289L),  $\pm 0.025\%$  max (289K),  $\pm 0.05\%$  max (289J). All versions of the 289 provide a small signal frequency response from dc to 20kHz (-3dB) and a large signal response from dc to 5kHz (full power) at a gain of 1V/V. This new design offers true 3-port isolation,  $\pm 2500\text{V}$  dc between inputs and outputs (or power inputs), as well as 240V rms between power supply inputs and signal outputs. Using carrier modulation techniques with transformer isolation, model 289 interrupts ground loops and leakage paths and minimizes the effect of high voltage transients. It provides 120dB Common Mode Rejection between input and output common. The high CMV and CMR ratings of the model 289 facilitate accurate measurements in the presence of noisy electrical equipment such as motors and relays.

### WHERE TO USE THE MODEL 289

The model 289 is designed to interface single and multichannel data acquisition systems with dc sensors such as thermocouples, strain gauges and other low level signals in harsh industrial environments. Providing high accuracy with complete galvanic isolation, and protection from line transients of fault voltages, model 289's performance is suitable for applications such as process controllers, current loop receivers, weighing systems, high CMV instrumentation and computer interface systems.

Use the model 289 when data must be acquired from floating transducers in computerized process control systems. The photograph above shows a typical multichannel application allowing potential differences or interrupting ground loops, among transducers, or between transducers and local ground.

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### DESIGN FEATURES AND USER BENEFITS

**Isolated Power:** The floating power supply section provides isolated  $\pm 15\text{V}$  outputs @  $\pm 5\text{mA}$ . Isolated power is regulated to within  $\pm 5\%$ . This feature permits model 289 to excite floating signal conditioners, front-end buffer amplifiers and remote transducers such as thermistors or bridges, eliminating the need for a separate isolated dc/dc converter.

**Adjustable Gain:** A single external resistor adjusts the model 289's gain from 1V/V to 100V/V for applications in high and low level transducer interfacing.

**Synchronized:** The model 289 provides a synchronization terminal for use in multichannel applications. Connecting the synchronization terminals of model 289s synchronizes their internal oscillators, thereby eliminating the problem of oscillator "beat frequency" interference that sometimes occurs when isolation amplifiers are closely mounted.

**Internal Voltage Regulator:** Improves power supply rejection and helps prevent carrier oscillator spikes from being broadcast via the isolator power terminal to the rest of the system.

**Buffered Output:** Prevents gain errors when an isolation amplifier is followed by a resistive load of low impedance. Model 289 can drive a  $2\text{k}\Omega$  load.

**Three-Port Isolation:** Provides true galvanic isolation between input, output and power supply ports. Eliminates need for power supply and output ports being returned through a common terminal.

**Reliability:** Model 289 is conservatively designed to be capable of reliable operation in harsh environments. Model 289 has a calculated MTBF of 271,835 hours. In addition, the model 289 meets UL Std. 544 leakage,  $2\mu\text{A}$  rms @ 115V ac, 60Hz.



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