

7B21 Isolated, High Level Voltage Input

Functional Description

The 7B21 is a unity gain single-channel signal conditioning module that interfaces, filters and isolates a ± 10 Volt input signal and provides a protected precision output of ± 10 Volt. Model 7B21 features a nonlinearity of $\pm 0.02\%$ maximum and an accuracy of $\pm 0.1\%$ maximum ($\pm 0.01\%$ typical). To accurately measure low level signals in electrically noisy environments, 1500 V rms of galvanic transformer-based isolation with a common mode rejection (CMR) of 100 dB @ 50/60 Hz is provided. Rated to operate with a nominal +24 V DC supply, Model 7B21 is mix-and-match and hot-swappable with other 7B Series input modules, so it can be inserted or removed from any socket in the same backplane without disturbing system power.

Inside the 7B21 Series Module

The floating differential input of Model 7B21 is fully protected up to 120 V rms line voltage. A one-pole 300 Hz filter preconditions the input signal prior to a low drift differential input amplifier. Amplitude modulation is used to implement transformer isolation (1500 V rms input-to-output and power). Isolated front-end circuitry power is supplied by a DC/DC converter. The output section contains a two-pole low pass filter (-3 dB @ 300 Hz), a buffer amplifier and a power oscillator. The two-pole output filter and subsequent buffer ensures that a low noise, low impedance ($< 1 \Omega$) signal is available at the output to drive loads to 2 k Ω minimum.

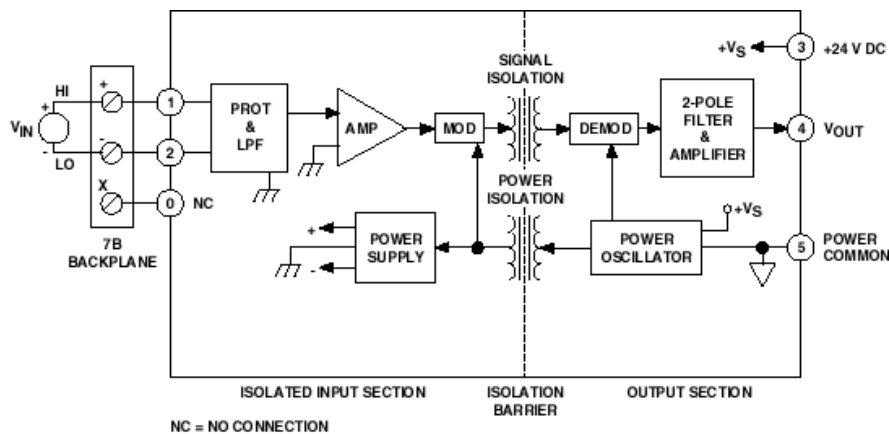


Figure 1. 7B21 Functional Block Diagram

Input Types

± 10 V

Output Options

± 10 V

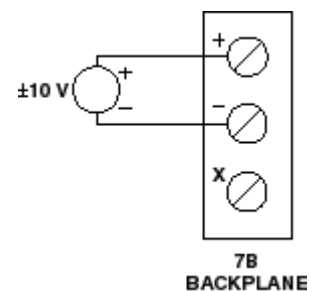


Figure 2. 7B21 Input Field Connections

7B21 Models Available

Model	Input Range	Output Range
7B21	-10 V to +10 V	-10 V to +10 V

7B21 Specifications

(typical @ +23°C ±5°C and $V_s = +24$ V dc)

Description	Model 7B21
Input Ranges	
Standard Ranges	-10 V to +10 V
Custom Ranges	Not Available*
Output Range Options ($R_L > 2$ kΩ)	-10 V to +10 V
Accuracy¹	
Initial @ +25°C	±0.01% Span (±0.1% Span, maximum)
Nonlinearity ²	±0.02% Span, maximum
Input Offset vs. Temperature	N/A ³
Span vs. Temperature	±35 ppm/°C
Output Offset vs. Temperature	±0.001% Span/°C
Input Bias Current	30 pA (200 pA, maximum)
Input Resistance	
Power ON	2 M Ω
Power OFF	30 k Ω , minimum
Output Noise	
5 MHz Bandwidth	6 mV peak
10 Hz to 100 kHz Bandwidth	1.5 mV rms
0.1 Hz to 10 Hz Bandwidth	6 μ V peak
Bandwidth, -3 dB	300 Hz
Output Rise Time, 10% to 90% Span	1 ms
Common-Mode Voltage (CMV)	
Input-to-Output and Power	1500 V rms continuous
Common Mode Rejection (CMR)	
Input-to-Output and Power @ 50/60 Hz	100 dB
Input Protection	120 V rms, continuous ±35 V dc, continuous
Input Transient Protection	ANSI/IEEE C376.90.1-1989 IEEE-STD 472 IEC 255-4, Class II
Output Resistance	< 1 Ω
Voltage Output Protection	Continuous Short to Ground
Power Supply	
Voltage Range, Operating	+19 V dc to +29 V dc
Current	+35 mA, maximum
Sensitivity	±0.0001%/‰ of V_s
Mechanical Dimensions	1.663" x 2.11" x 0.563" (42.24 mm x 53.6 mm x 14.3 mm)
Weight	60 grams
Environmental	
Temperature Range	
Operating	-40°C to +85°C
Storage	-40°C to +85°C
Relative Humidity, 24 hours	0 to 90% @ +60°C noncondensing
ESD Sensitivity	IEC 801-2, Level 2
RFI Susceptibility	±0.5% Span error @ 400 MHz, 5 Watt, 3 ft

Warm-up time required to meet specifications is approximately 10 minutes.

* Contact factory for OEM requirements.

¹ Includes the combined effects of repeatability, hysteresis, and nonlinearity.

² Nonlinearity is calculated using best-fit straight line method.

³ Rz is the value of the RTD resistance at the lowest measurement point. R_{span} is the change in resistance over the measurement span.

Specifications subject to change without notice.