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Find the *Tegam 4040A* at our website: ***Click HERE***

Differential Instrumentation Amplifier

- Differential 100 V Common Mode Input
- DC-50 MHz Bandwidth
- AC/DC Coupling
- Programmable Attenuation/Gain/Offset
- 9 nV/√Hz Input Noise
- 50 Ω Output



Figure 1.1 Block Diagram

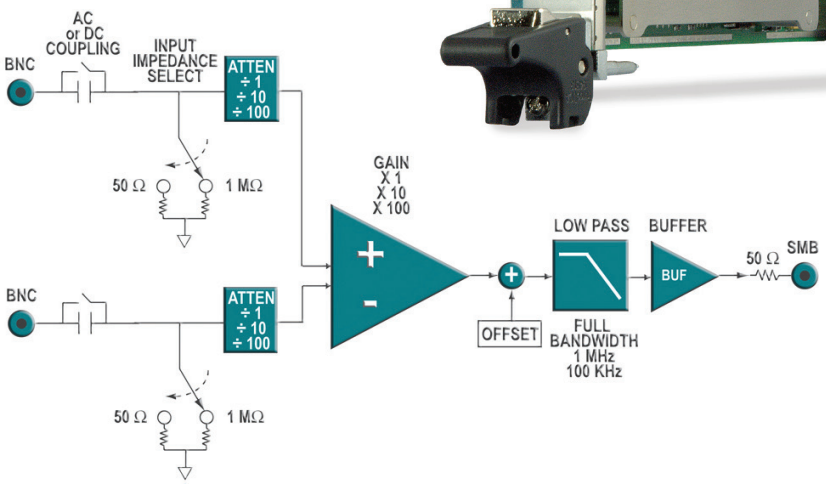


Table 1.1 – Various Combination Possibilities of the 4040A

Net Gain	Input Attenuation	Internal Amplifier Gain	Peak AC Input Amplitudes (V) d per channel a.b.c.d.	Max Differential Voltage (V) w/o clipping a.b.c.d.	Max Volts to Chassis a.b.c.	Noise Referred to Input	-3 dB Bandwidth
÷100	÷100	X1	≤100	≤100	100 V	990 nV/√Hz	20 MHz
÷10	÷10	X1	≤10	≤10	40 V	99 nV/√Hz	20 MHz
÷10	÷100	X10	≤10	≤10	100 V	990 nV/√Hz	50 MHz
1	÷1	X1	≤1	≤1	4 V	9 nV/√Hz	20 MHz
1	÷10	X10	≤1	≤1	40 V	99 nV/√Hz	50 MHz
1	÷100	X100	≤1	≤1	100 V	990 nV/√Hz	20 MHz
10	÷1	X10	≤0.1	≤0.1	4 V	9 nV/√Hz	50 MHz
10	÷10	X100	≤0.1	≤0.1	40 V	99 nV/√Hz	20 MHz
100	÷1	X100	≤0.01	≤0.01	4 V	9 nV/√Hz	20 MHz

a) DC coupled, 1 MΩ input
b) AC coupled, 1 MΩ input: DC + Peak AC not to exceed 100 V; Peak AC component not to exceed table
c) 5 Vrms max into 50 Ω
d) DAC offset adjustment to zero

The TEGAM Model 4040A expands the measurment range of your digitizer or analog inputs to real-world signals ranging from 100 V supply voltages to millivolt detector outputs. Elevated voltages and noisy environments present a barrier to making acceptable measurements with common digitizers that are limited by input impedance and voltage levels. Your investment in a high performance digitizer is significantly enhanced by having an instrumentation grade connection to the point of measurement.

The TEGAM Model 4040A includes six stages of signal-matching to ensure that you get the maximum use from your high-speed digitizer:

1. **Selectable input impedance** of 50 Ω or 1 MΩ, to match impedance with coaxial cables or oscilloscope probes.
2. Selectable **AC or DC coupling** allows processing of small AC signals with large DC offset.
3. **Selectable input attenuations** of ÷10 and ÷100 allows input levels as high as 100 V to be safely processed by the digitizer[1].
4. Instrumentation amplifier to **reject common-mode voltages** and provides gain of X1, X10 and X100 for measuring small signals[1].
5. **Programmable low-pass filters** to assist with noisy signals or to anti-alias at lower sampling rates.
6. **Programmable output offset** allows centering the output signal in the digitizer's span to maximize dynamic range.

[1]See Table 1.1 for specific combinations and limitations of settings.

Software

The TEGAM Model 4040A comes complete with VISA-compliant drivers for LabVIEW, Microsoft C++ and Visual Basic. In addition, an interactive front panel application provides manual control of all of the board's features.

Prices and specifications subject to change without notice.
4040A-909-01 Rev B

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TEGAM

Model 4040A

DIFFERENTIAL INSTRUMENTATION AMPLIFIER

Specifications	VALUE	CLARIFICATIONS
Input Specifications		
Channels	Single Channel	Differential Inputs
Gains	100, 10, 1, 0.1, 0.01	
Maximum Voltage Range	±100 V	DC + Peak AC
Coupling	AC, DC	In AC 10 Hz and above
Input Impedance	1 MΩ || 20 pF, 50 Ω	±1%, Selectable
Input Voltage Range	±100 V ±10 V ±5V ±1 V ±0.1 V ±0.011 V	For Gain 0.01 @ 1 MΩ Input Impedance For Gain 0.1 @ 1 MΩ Input Impedance For Gain 0.1 @ 50 Ω Input Impedance For Gain 1 For Gain 10 For Gain 100
Connection Type	BNC Jacks	50 Ω, Quantity 2
Common Mode Rejection Ratio (CMRR)	77 dB at 60 Hz (> 50 dB at 1 MHz) 57 dB at 60 Hz 37 dB at 60 Hz	For Gain setting of x1, x10, and x100 & Attenuation setting of ÷1 For Attenuation setting of ÷10 For Attenuation setting of ÷100
Total Harmonic Distortion	<-60 dB @ 1 MHz	Output 1 Vp-p into 50 Ω
DC Gain Accuracy	±(0.1 % input + 100 µV) ±(1.5 % input + 300 µV)	Offset set to 0 for Gain 10, 1, 0.1, 0.01 Offset set to 0 for Gain 100
(Basic) AC Gain Accuracy	± 0.15 dB	Attenuation of 1, Gain of 1, *See Figures 1.2, 1.3 and 1.4 for other settings*
Over-voltage Protection (In Any Range)	±100 V	DC + Peak AC
Offset Range	0 to ± Full Scale	Full Scale output of ±1 V into 50 Ω, All Gain Ranges
Offset Resolution	38 µV per step	65,535 total DAC steps into 50 Ω
Offset Accuracy	±(0.5 % of Setting + 300 µV)	Referenced to 1 V Range
Temperature Stability	±(0.01 % of rdg + 40 µV)/°C	All Gain Ranges
Noise	9 nV/√Hz	CMR=±1 V, Gain 10 and 100, Referred to Input for Frequencies >100 Hz
Rise Time	≤ 3.5 ns	
Output Specifications		
Maximum Output Voltage	±1 V	Single Ended into 50 Ω
Connection Type	SMB Jack	50 Ω
Output Impedance	50 Ω	±1%
LP Filter, Cutoff Frequency	100 kHz, 1 MHz	Single Pole Filter
Bandwidth	*See Table 1.1*	
Passband Flatness	*See Figures 1.2, 1.3 and 1.4 for limits*	Limits off charts will not exceed ± 3 dB for the Bandwidths listed in Table 1.1
Environmental Specifications		
Operating Temperature	0 °C to +45 °C, (32 °F to 113 °F) Ambient	
Storage Temperature	-20 °C to +50 °C, (-4 °F to +122 °F)	
Humidity Range	<80% RH Non-Condensing	
Warm-Up Time	30 minutes	

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Specifications	VALUE	CLARIFICATIONS
Included Accessories	CD Manual	4040A-840
Optional Accessories	1 ft SMB Female to SMB Female Cable	CA-3-12
	1 ft BNC Male to SMB Female Cable	CA-4-12
	3 ft BNC Male to SMB Female Cable	CA-4-36
	3 ft BNC Cable for General Purpose I/O Connections	CBL-3102
	50 ohm BNC (F-M-F) Tee adapter	BNC-3285

Figure 1.2

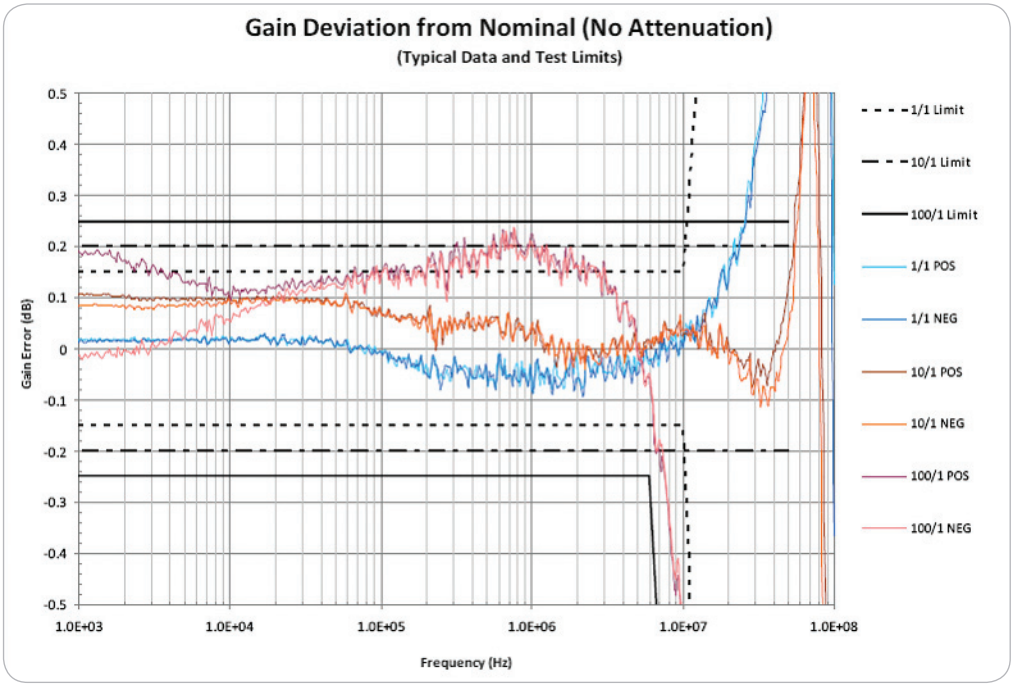


Figure 1.3

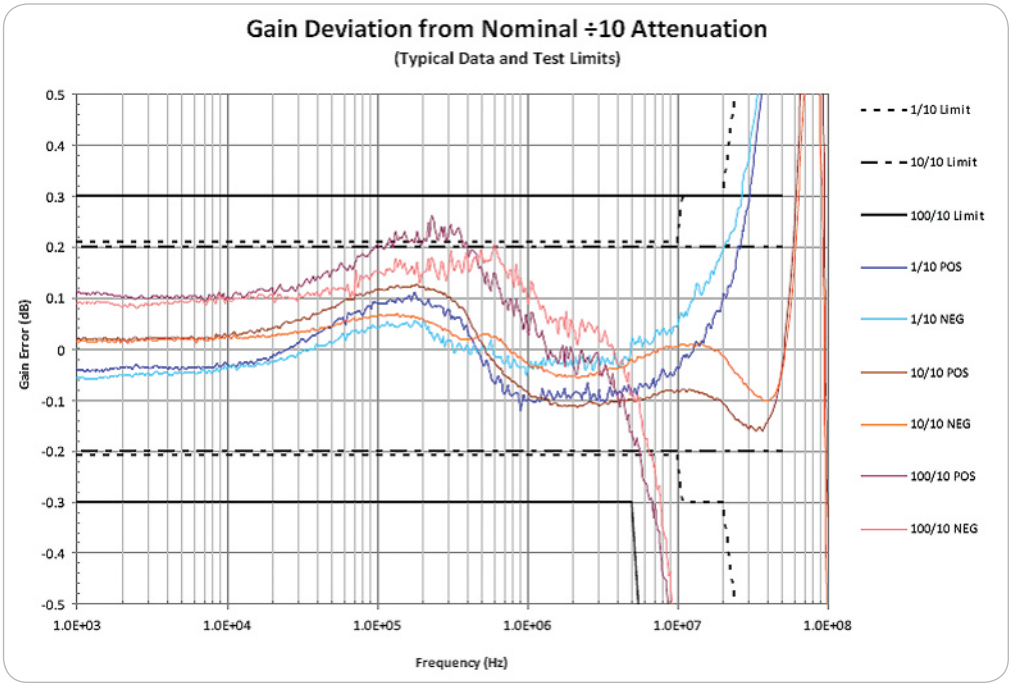
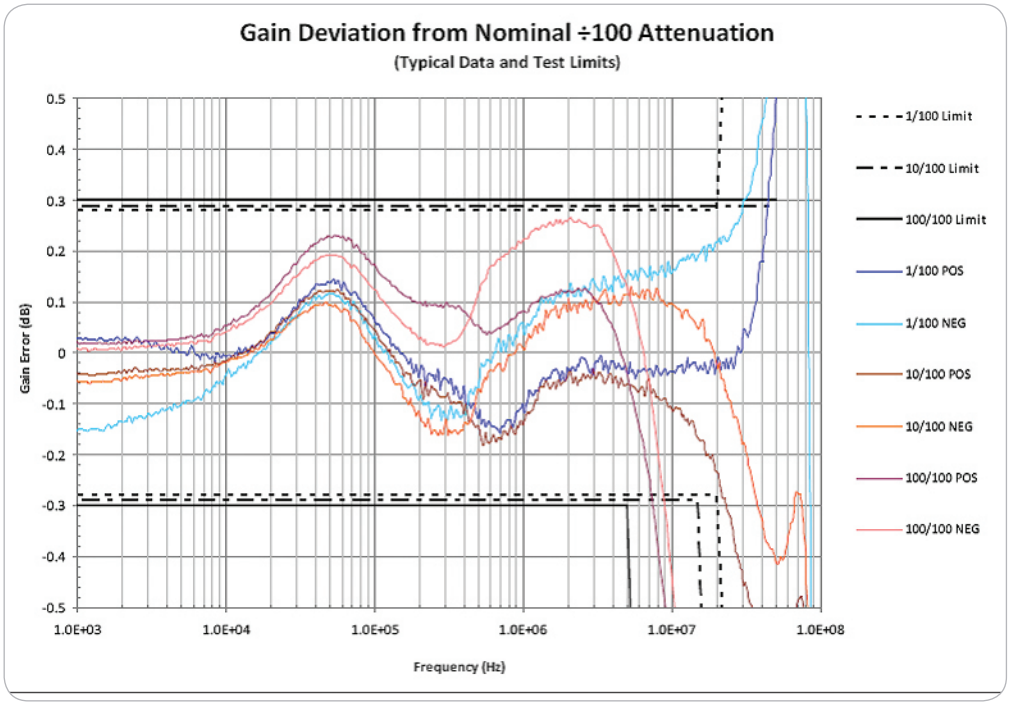


Figure 1.4



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