

PA-5, PA-6 and PA-7 PREAMPLIFIERS

Operating Instructions



**TELEDYNE
JUDSON TECHNOLOGIES**

A Teledyne Technologies Company

PB 216

April 2002

Teledyne Judson transimpedance preamplifiers are designed to get the best performance from Teledyne Judson Germanium, Indium Arsenide and Indium Antimonide detectors. Each amplifier has switch-selected variable gain as shown in the table below. Bandwidth depends on detector resistance and capacitance as shown on the attached graphs.

CONNECTIONS:

Input and output connectors are BNC feedthroughs. Power supply and ground connections are made through Lemo connector as shown on the reverse side of this sheet.

CAUTIONS:

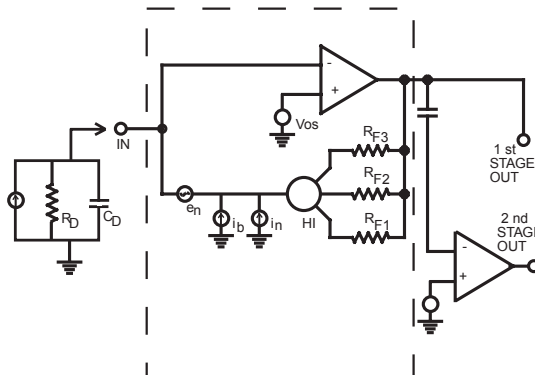
**CONNECT DETECTOR BEFORE
TURNING ON POWER SUPPLY.
CORRECT POWER SUPPLY
POLARITY MUST BE OBSERVED.
REVERSAL MAY DAMAGE
PREAMPLIFIER.**

Typical Specifications Model PA-5, PA-6 and PA-7 Current Mode Preamplifiers @ 25°C

Model		PA-7 Series			PA-6 Series		PA-5	Units
		PA-7-70	PA-7-60	PA-7-50	PA-6-60	PA-6-50	PA-5-50	
Transimpedance Gain: (Switch Selected)	High	10^7	10^6	10^5	10^6	10^5	10^5	V/A
	Med	10^6	10^5	2.5×10^4	10^5	2.5×10^4	10^4	
	Low	10^5	2.5×10^4	10^4	2.5×10^4	10^4	10^3	
Bandwidth	@ High Gain	8	60	150	60	150	200	KHz
$R_D > 10K$, $C_D < 0.2nF$ (See Figs. 53-2, 53-3)	@ Med Gain	60	150	200	150	200	200	
	@ Low Gain	150	200	200	200	200	200	
Input Offset Voltage (V_{os})		± 250	± 250	± 250	± 100	± 100	± 80	μV
Input Bias Current (i_b)		± 0.001	± 0.001	± 0.001	± 12	± 12	± 30	nA
Voltage Noise Density (e_n)@1KHz		12	12	12	4.5	4.5	1.1	$nV Hz^{-1/2}$
Voltage Noise from 0.1 to 10Hz		1.5	1.5	1.5	.080	.080	.035	μV_{pp}
Current Noise Density (i_n)@1KHz†		.04	.13	.04	.5	.64	1	$pA Hz^{-1/2}$
Output Impedance		< 100						Vpp
Maximum Output Voltage		± 10						
Power Requirements		+12V and -12VDC @ 10mA or +15V and -15VDC @ 10mA						
Recommended for Detector Series:		J16, J16TE1, J16TE2, J16D, J10D			J16, J12TE2, J12TE3		J12 J12TE2	

† At High Gain Setting

Equivalent Circuit for Transimpedance Preamplifiers



- e_n : Voltage Noise Density
- i_n : Current Noise Density
- V_{os} : Input Offset Voltage
- i_b : Input Bias Current
- R_D : Detector Resistance
- C_D : Detector Junction Capacitance

PA-5, PA-6 and PA-7 PREAMPLIFIERS

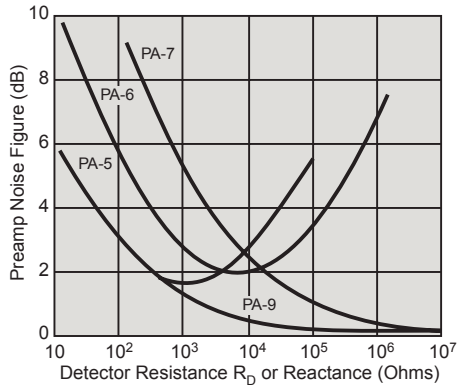
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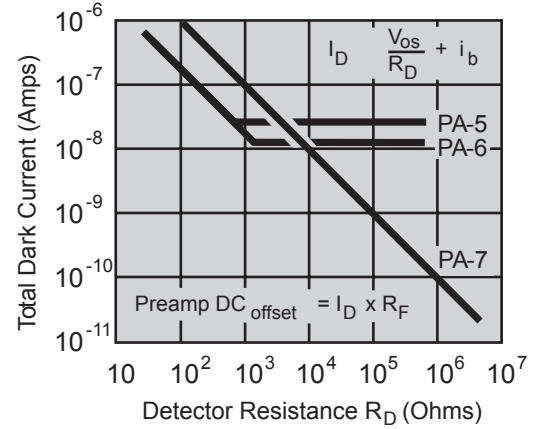
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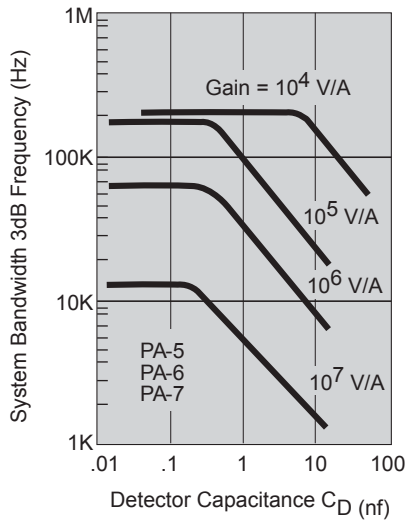
Preamplifier Noise Figure vs Detector Resistance



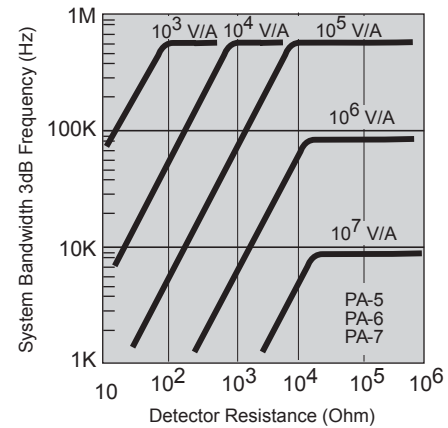
DC Offset Output Voltage vs Source Resistance



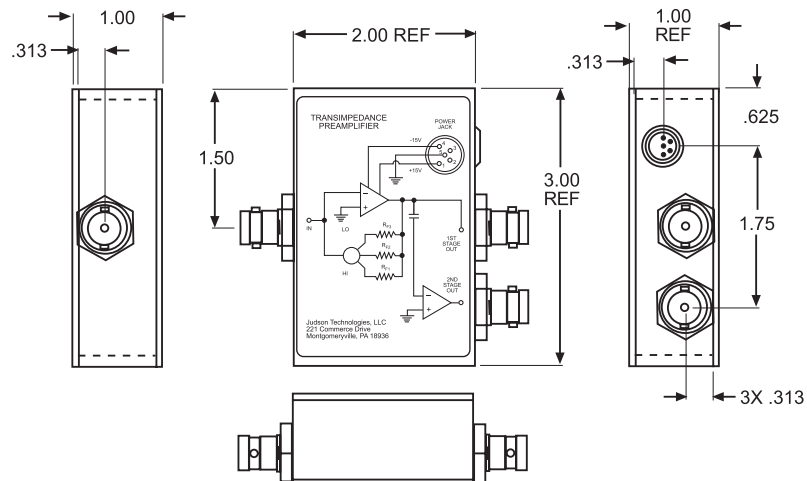
System Bandwidth vs Detector Capacitance



System Bandwidth vs Detector Resistance



PIN #	DESCRIPTION
1	+12V or +15V
2	N/C
3	N/C
4	-12V or -15V
5	GND



Information in this document is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omission. Specifications are subject to change without notice.