

# Current Amplifier with Variable Gain iAMP-500

PRELIMINARY  
DATA SHEET



## DESCRIPTION

The iAMP-500 is a low-noise, programmable current amplifier for the frequency range from DC to 700 kHz. Due to its adjustable gain of  $10^2$  to  $10^{11}$  V/A it is suitable for applications where a transformation from small signals into manageable output voltages is required. AC- or DC-coupled input may be selected as required. All parameters can be adjusted both directly via membrane keyboard and read out via an LCD display on the current amplifier as well as via a digital interface e.g. with a PC. The compact and EMI-proof housing permits operation in direct proximity to the source. As far as a bias is needed for the detector it is available within the range of -10 V to +10 V directly from the iAMP-500.

Due to the very high, low-noise gain dynamics and the simple handling the iAMP-500 is suitable as a preamplifier and power amplifier. It can be used as a universal laboratory amplifier, preamplifier for lock-ins.



## FEATURES

- Transimpedance (Gain) switchable from  $10^2$  to  $10^{11}$  V/A
- Bandwidth DC / 1 Hz to 700 kHz
- Input Noise of 9 fA/ $\sqrt{\text{Hz}}$
- Adjustable Bias Voltage of +/- 10V
- Membrane Keyboard with LCD-Display
- Digital Interface

## APPLICATIONS

- Photodiode and Photomultiplier Amplifier
- Preamplifier for Lock-Ins, etc.
- Spectroscopy
- Microscopy
- Ionisation Detectors

## GENERIC CHARACTERISTICS

Input voltage		$\pm 15$	V
	(stabilised)	+5	V
Temperature Range	Operating	0 ... +60	°C
	Storage	-40 ... +100	°C



## ABSOLUTE MAXIMUM RATINGS

Signal Input Voltage	-16 +12	V V
Transient Input Voltage	±3	kV
Power Supply Voltage	±22	V

## CONNECTORS

Signal Input	BNC
Signal Output	BNC
Power Supply	LEMO (ERA.2S.305.CLL)
Control Port	RS232

## TECHNICAL SPECIFICATIONS

(@ V = ±15V, T<sub>op</sub> = 25°C)

Gain	Transimpedance	10 <sup>2</sup> – 10 <sup>11</sup>	V/A
	Gain Accuracy	±1	%
	Gain Drift	see table below	
Frequency Response	Lower Cut-Off Frequency	DC / 1 Hz	
	Upper Cut-Off Frequency	up to 700 kHz (see table below), switchable to 10 Hz	
	Gain Flatness	±0.1	dB
Input	Equivalent Input Noise Current	see table below (value per √Hz, @ 500 Hz)	
	Equivalent Input Noise Voltage	4 nV/√Hz (@100 Hz)	
	Input Offset Current Drift	see table below	
	Input Bias Current	1 pA typ. (max. 3 pA)	
	Max. Input Current	see table below (value for linear amplification)	
	Input Offset Compensation	adjustable by control	
Output	Output Voltage	±10 V (@>10 kΩ load)	
	Output Impedance	50 Ω (terminate with > 10 kΩ load for best performance)	
	Max. Output Current	±100 mA	
Detector Bias	Bias Voltage Range	±10 V, max. 22 mA	
Digital Control	Control Input Voltage Range		
	Control Input Current		
	Overload Output		
Offset Control	Control Voltage Range	±10 V	
	Offset Control Input Impedance	20 kΩ	



## GAIN SETTING: „LOW NOISE“

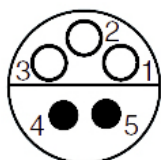
	10 <sup>2</sup>	10 <sup>3</sup>	10 <sup>4</sup>	10 <sup>5</sup>	10 <sup>6</sup>	10 <sup>7</sup>	10 <sup>8</sup>	10 <sup>9</sup>	V/A
Upper Cut-Off Frequency	720	720	480	480	72	72	1.6	1.6	<b>kHz</b>
Rise/Fall Time (10%-90%)	0.5	0.5	0.7	0.7	5	5	200	200	<b>µs</b>
Equivalent Input Noise Current	26	24	2.6	2.2	0.28	0.26	0.009	0.009	<b>pA</b>
Input Offset Current Drift	TBA	30000	3000	300	27	2.5	0.2	0.06	<b>pA</b>
Gain Drift	TBA	0.008	0.008	0.008	0.010	0.010	0.010	0.020	<b>%</b>
Max. Input Current	10 <sup>6</sup>	10000	1000	100	10	1	0.1	0.01	<b>µA</b>
Max. Input Offset Compensation Range	10 <sup>7</sup>	100000	10000	1000	100	10	1	0.1	<b>nA</b>
DC Input Impedance (//5pF)	50	50	50	50	150	150	10000	10000	<b>Ω</b>

## GAIN SETTING: „HIGH SPEED“

	10 <sup>4</sup>	10 <sup>5</sup>	10 <sup>6</sup>	10 <sup>7</sup>	10 <sup>8</sup>	10 <sup>9</sup>	10 <sup>10</sup>	10 <sup>11</sup>	V/A
Upper Cut-Off Frequency	720	720	480	480	72	72	1.6	1.6	<b>kHz</b>
Rise/Fall Time (10%-90%)	0.5	0.5	0.7	0.7	5	5	200	200	<b>µs</b>
Equivalent Input Noise Current	26	24	2.6	2.2	0.28	0.26	0.009	0.009	<b>pA</b>
Input Offset Current Drift	TBA	30000	3000	300	27	2.5	0.2	0.06	<b>pA</b>
Gain Drift	TBA	0.008	0.008	0.008	0.010	0.010	0.010	0.020	<b>%</b>
Max. Input Current	10 <sup>6</sup>	100000	10000	1000	100	10	1	0.1	<b>µA</b>
Max. Input Offset Compensation Range	10 <sup>6</sup>	100000	10000	1000	100	10	1	0.1	<b>nA</b>
DC Input Impedance (//5pF)	50	50	50	50	150	150	10000	10000	<b>Ω</b>

## CONNECTOR CONFIGURATION

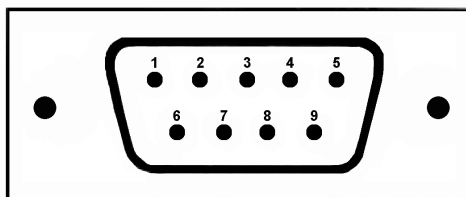
PIN	Connection
1	GND
2	-15 V
3	GND
4	+15 V
5	+5 V



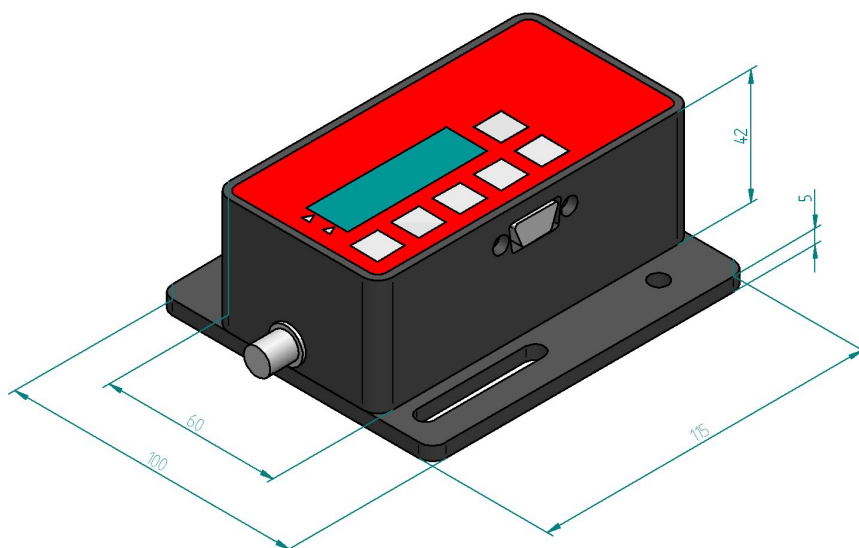
### CONNECTOR CONFIGURATION

DE-9-connector, male

- Pin 1: NC
- Pin 2: RXD (Receive Data)
- Pin 3: TXD, TX, TD (Transmit Data)
- Pin 4: NC
- Pin 5: GND (Ground)
- Pin 6: NC
- Pin 7: NC
- Pin 8: NC
- Pin 9: NC



### DIMENSIONS



### ACCESSORIES

The iAMP-PSU is a small inexpensive power supply matched with the iAMP-500. It supplies a stable +/-15V and 5V voltage and has an integrated continuous short circuit and over voltage protection. The power supply is already assembled with the LEMO connector (FFA.2S.305.CLAC72) fit into the iAMP-500.

05/11/ V2 / HW / lce/ iamp-500.doc