BENTHAM

498
Hybrid AC Current Pre-amplifier - DC Nanoammeter Module

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- Six decade trans-impedance amplifier
- Up to 10^8 V/A gain
- Dual Input for use with multiple detectors
- Virtual ground input
- Integrated 14½ bit integrating ADC
- 100ms ADC integration time
- Fully programmable via USB interface through 417 unit

The 498, combining a six-decade trans-impedance amplifier and A to D converter, has been developed to respond to two specific signal detection requirements, particularly pertinent in the testing of photovoltaic devices of various type.

In the DC mode, it can be used as the main detection electronic, incorporating both current amplifier and A to D converter. In the AC mode, it is used as a pre-amplifier for a lock-in amplifier employing current source detectors such as photomultipliers and photodiodes.

The virtual earth inputs (two) of the amplifier ensure that the detector is kept in short circuit condition, whereby no voltage is generated across the detector as a result of the photocurrent it produces. This short circuit operation enhances the linearity of detectors, reduces the effect of cable capacitance and is often a necessary condition in the determination of detector responsivity.

The 498 is a double-width module, housed within the 417/T mother unit.

Used in conjunction with the 496 lock-in amplifier, the 498 allows the user to select a combination of current and voltage gain which optimises the trade-off of noise performance versus DC current sinking.

Gain range and input in use may be selected via the USB interface, over which is passed the measurement result and range over-load/ under-load flags from the A to D converter.

Interface & Mechanical	
Interface	USB via 417/417T Unit (I^2C)
Control	Front panel/ USB
Front Panel Controlled Features	Input select, gain range select
Dimensions	Dual width module, 3U high
Connector	BNC
Display	Digital display of 417 unit, channel A

Electrical	
Channel 1 input	Current input to trans-impedance amplifier
Channel 2 input	Current input to trans-impedance amplifier
Gain Ranges	10^8-10^3 V/A
Maximum Current Input	10mA
Gain Accuracy	+1%
Gain Stability	200ppm/°C
Output Stability	5ppm/°C to 500ppm/°C depending on sensitivity
Linearity	< 0.025% departure from linearity from zero to full scale
ADC Resolution	4½ digit BCD (0 to 19999) i.e. > 14 bit resolution
ADC Integration Time	100ms
Input Impedance	Virtual earth
Frequency Response 10^3 V/A Range (-3dB)	> 1MHz
Frequency Response 10^4 V/A Range (-3dB)	1MHz
Frequency Response 10^5 V/A Range (-3dB)	260kHz
Frequency Response 10^6 V/A Range (-3dB)	30kHz
Frequency Response 10^7 V/A Range (-3dB)	23kHz
Frequency Response 10^8 V/A Range (-3dB)	4kHz

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