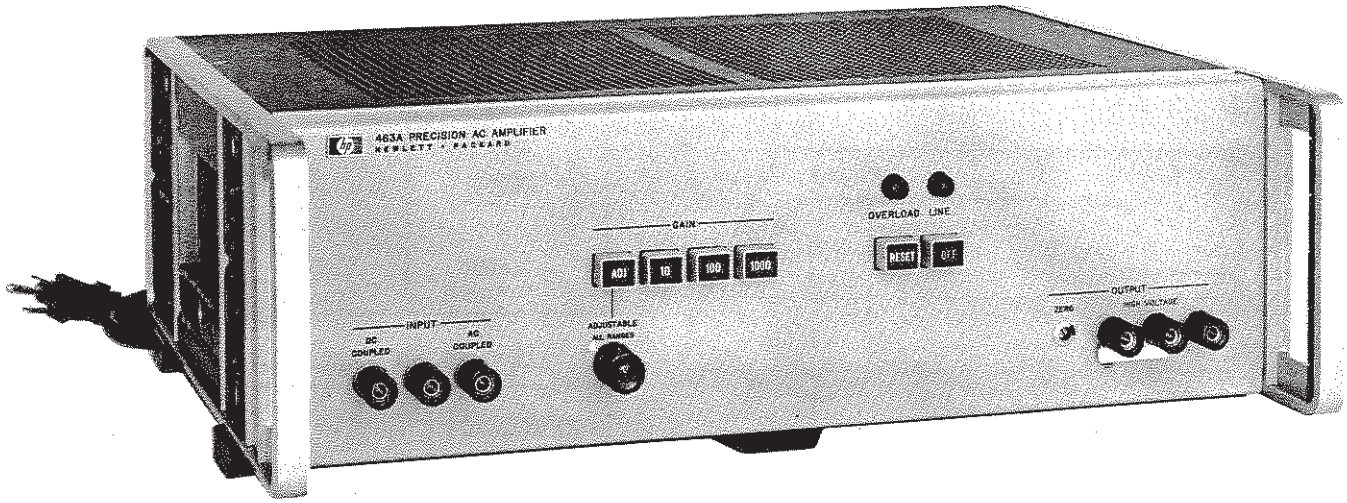


Figure 1-1. Model 463A Precision AC Amplifier

Table 1-1. Specifications

FIXED GAIN (DC COUPLED)

X10 Range

Accuracy: DC to 10 Hz, < ±0.3%*
10 Hz to 10 kHz, < ±0.01%
10 kHz to 100 kHz, < ±0.1%

Distortion (100 V Output, Full Load):
10 Hz to 10 kHz, < 0.01%
10 kHz to 100 kHz, < 0.1%

X100 Range

Accuracy: DC to 10 Hz, < ±3%*
10 Hz to 20 kHz, < ±0.1%
20 kHz to 100 kHz, < ±1.0%

Distortion (100 V Output, Full Load)
10 Hz to 10 kHz, < 0.03%
10 kHz to 100 kHz, < 0.1%

X1000 Range

Accuracy: DC to 10 Hz, < ±30%*
10 Hz to 20 kHz, < ±0.3%
20 kHz to 100 kHz, < ±3.0%

Distortion (100 V Output, Full Load):
10 Hz to 10 kHz, < 0.1%
10 kHz to 100 kHz, < 0.5%

FIXED GAIN (AC COUPLED)

Identical to dc coupled except coupling capacitor causes a 0.01% error (25 Hz) to a 3-dB error (0.35 Hz).

ADJUSTABLE GAIN (AC OR DC COUPLED)

Gain may be adjusted from 0 to 100% of the fixed gain range. Distortion characteristics identical with fixed gain range.

TEMPERATURE COEFFICIENT (FIXED GAIN)

Frequency	X10	GAIN X100	X1000
10 Hz to 10 kHz	10 ppm/°C**	50 ppm/°C**	100 ppm/°C**
10 kHz to 100 kHz	50 ppm/°C**	250 ppm/°C**	500 ppm/°C**

* Includes temperature coefficient and short term stability
** Deviation from calibration temperature

INPUT CHARACTERISTICS

Input Impedance:
Fixed gain: 1 MΩ (± 5%), < 35 pF
Adjustable gain: 50 kΩ, < 200 pF

Maximum Input Voltage: protected to ±150 volts. AC Coupling capacitor ± 500 volts peak.

Noise (rms referred to input):

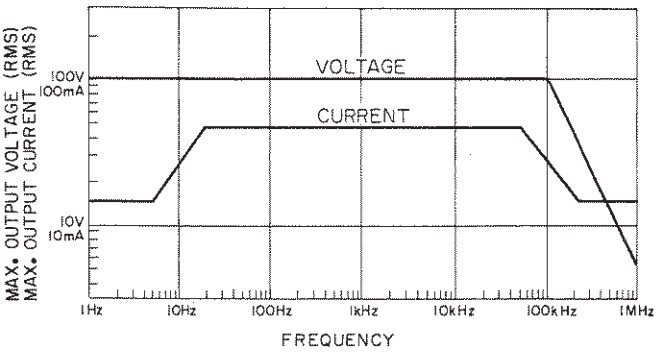
GAIN RANGE	< 1 k SOURCE	> 1 k SOURCE*
X10	1.5 mV	1.5 mV
X100	150 μV	300 μV
X1000	50 μV	200 μV

* with input shielded

Table 1-1. Specifications (Cont'd)

OUTPUT CHARACTERISTICS

Maximum Output: DC: 100 volts, 20 mA
AC: refer to curve below



LOAD CAPABILITY

Maximum Output Power: 5 watts continuous

Current Limit (Nominal): < 20 Hz, 30 mA peak
> 20 Hz, 90 mA peak

Minimum Resistance, All Ranges: 100 Ω

Maximum Capacitance: capacitance drive capability of 463A is increased by adding a resistor in series with the output as indicated below.

GAIN RANGE	SERIES RESISTANCE	MAXIMUM CAPACITANCE
X10	0 600 Ω	300 pF No Limit
X100	0 50 Ω	1000 pF No Limit
X1000	0 50 Ω	5000 pF No Limit

OUTPUT IMPEDANCE

GAIN RANGE	OUTPUT IMPEDANCE (OHMS)	
	DC to 10 kHz	10 kHz to 100 kHz
X10	.05	.5
X100	.2	2.
X1000	2.	20.

SQUARE WAVE RESPONSE (FIXED GAIN)

X10: 40 V p-p, 0.5 μs rise time
X100: 80 V p-p, 1 μs rise time
X1000: 200 V p-p, 2 μs rise time

PHASE SHIFT (FIXED GAIN) IN DEGREES

GAIN RANGE	< 1 kHz	> 1 kHz
X10	.1	$.1 + 7\left(\frac{f}{10^5}\right)$
X100	.2	$.2 + 20\left(\frac{f}{10^5}\right)$
X1000	1.0	$1 + 50\left(\frac{f}{10^5}\right)$

LONG TERM STABILITY (FIXED GAIN)

FREQUENCY	X10	GAIN X100	X1000
10 Hz to 10 kHz	0.003%/mo or 0.01%/yr	0.03%/mo or 0.1%/yr	0.3%/mo or 1%/yr
10 kHz to 100 kHz	0.03%/mo	0.3%/mo	3%/mo

DC ZERO STABILITY

Short Term: (23°C ± 1°C)

GAIN Range	V/hr (output)
X10	0.05
X100	0.5
X1000	5.0

Temperature Coefficient:
DC Coupled < 10 kΩ source: ±400 μV/°C referred to input.
DC Coupled > 10 kΩ source or AC Coupled: ±4 mV/°C referred to input.

GENERAL

Input/Output Terminals:
Front Panel: 3/4" spaced banana terminals for input, output, and chassis.
Rear Panel: BNC terminals for input and output. Recessed three-terminal power line connector. Amplifier common may be floated 500 V dc above chassis.

Temperature Range: 0 to + 50°C.

Power: 115 or 230 V ± 10%, 50 to 1000 Hz, approximately 50 W at full load.