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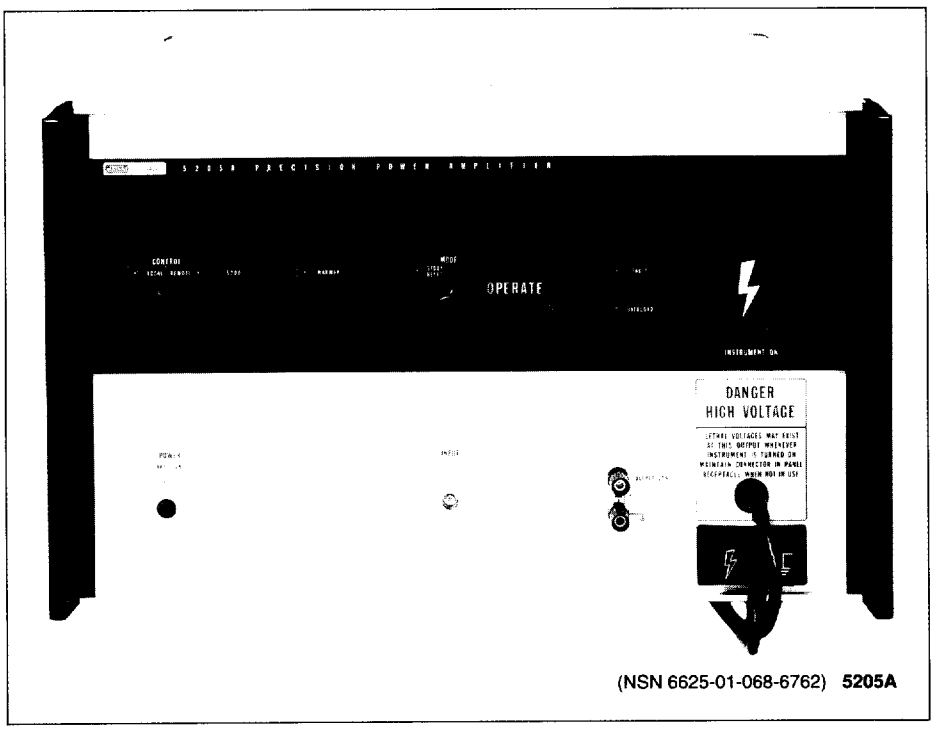
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(NSN 6625-01-068-6762) **5205A**

5205A Precision Power Amplifier

- Extends range of 5700A, 5100B Series, 5200A, 5440B, 5442A Calibrators
- Output voltages to 1100V rms, ±1500V dc
- Maximum output power 220 watts
- DC to 100 kHz, typical upper limit 120 kHz
- 420 ppm midband amplitude uncertainty at 1000V rms
- 200 ppm midband six-month stability
- Fully programmable

The 5205A Precision Power Amplifier is a dc coupled programmable inverting amplifer with a fixed gain of 100. Designed as a precision calibration amplifer, the 5205A is also useful as a general-purpose amplifier for a wide range of waveforms from dc to 100 kHz. Alternating voltage output level is specified to 1100V at up to 200 mA, with a typical upper limit of 1200V before automatically tripping into standby mode. Direct voltage output level is specified to ±1500V at up to 100 mA, with a typical upper trip limit of 1600V.

The 5205A includes automatic-overload sensing and recovery. Upon sensing an excessive slew rate or frequency of the input signal, or a momentary output overload, output is returned to zero within 2 microseconds and held there for 6 milliseconds or until the fault is corrected. When a steady overload, shorted output, or excessive input drive level is detected, the 5205A trips and locks into standby mode and displays a fault indicator.

A calibrator interface is standard, including an independent input signal line. When used with a 5700A, 5100B Series, 5200A, 5440B, or 5442A Calibrator, the 5205A is controlled by the calibrator as an extension of its capabilities.

A remote control interface is also standard, and independent of the calibrator interface. This allows remote switching between the calibrator and an alternate signal input source through a front panel BNC connector.

Amplifier features of the 5205A include a gain uncertainty of as little as 0.04%, and a slew rate as high as 800 volts per microsecond.

The 5205A includes a 1-meter output cable with a protective shrouded connector. When used with a 5200A AC Calibrator, remote sensing is brought to this connection point for maximum accuracy. An insulated receptacle is provided on the front panel for safe storage of the output connector when not in use. Option 5205 -07, for system applications, moves this cable and the BNC amplifier input connector to the rear panel.

All calibration adjustments and lamp replacements can be performed without exposure to high voltage. The output amplifier and all of the printed circuit modules are easily removed for repair or exchange.

Calibration and Characterization

The 5205A is calibrated at the Fluke manufacturing facility by instrumentation traceable to the U.S. National Institute of Standards and Technology. When ordered with a 5200A AC Calibrator, 5200A-900 characterization may be ordered including simultaneous characterization of the 5205A at points compatible with 5200A-800 software. See the 5200A Alternating Voltage Calibrator for more information.

Specifications

Technical Specifications

Calibrator Mode

Amplitude Uncertainty with 5100B Series Calibrator

Absolute Uncertainty*	
Frequency Hz	**±(ppm setting + mV)**
dc	700+30
50-10k	800+100
10k-50k	1200+150

** Includes transfer standards, dc reference source, and allowances for techniques. 180 days, 20°C to 30°C, after 1-hour warm-up*

Amplitude Uncertainty with 5200A Calibrator

Basic Instrument Absolute Uncertainty*		Characterized Uncertainty**		
Freq Hz	**±(ppm setting + ppm range)**	**Freq Hz**	**±(ppm setting + ppm range)**	
			Relative	**Absolute**
10-30	1200+50	50-100	190+20	210+20
30-20k	400+20	100-10k	180+20	200+20
20k-50k	800+50	10k-20k	200+20	220+20
50k-100k	1000+100	20k-50k	310+30	630+30

** Includes transfer standards, dc reference source, and allowances for techniques. 90 days, 18°C to 28°C, after 1-hour warm-up*

*** 180 days, 18°C to 28°C, after 1-hour warm-up. Requires 5200A-900*

Characterized-Point Absolute Uncertainty with 5200A:* ±ppm

Frequency, Hz							
50	100	200	1k	2k	10k	20k	50k
180	180	180	180	180	180	200	610

**Includes transfer standards, dc reference source, and allowances for techniques. 180 days, 18°C to 28°C, after 1-hour warm-up. Requires 5200A-900*

5205A

Amplitude Uncertainty with 5700A,5440B, or 5442A Calibrator: Use amplifier-mode gain uncertainty specifications
Output Voltage Range: 100V to 1099.999V, ±dV or rms aV
Output Voltage Resolution: 1 mV with 5200A, 5440B, or 5442A; 10 mV with 5100 Series B
Temperature Coefficient: For 0°C to 18°C and 28°C to 50°C, add ±(0.025 x uncertainty) per °C below 18°C or above 28°C

Stability with 5100 Series B, 5440B, or 5442A Calibrator: Use amplifier-mode gain stability specifications

Stability with 5200A Calibrator*

Frequency Hz	10 Minutes	24 Hours	6 Months
	±(ppm setting + ppm range)		
10-100	0 + 50	100 + 0	200 + 0
100-20k	70 + 5	100 + 0	200 + 0
20k-100k	70 + 5	200 + 0	400 + 0

**Constant line, load, and temperature, total peak to peak random change in rms value*

Amplifier Mode

Maximum Output Voltage: 1100V rms aV, ±1500V dV
Typical Overload Trip Voltage: 1200V rms aV, ±1600V dV
Maximum Input Voltage: 50V, dV or rms aV (without damage)
Frequency Range: 0 to 100 kHz
Typical Upper Trip Frequency: 120 kHz
Gain: X100, inverting

Gain Uncertainty

Maximum Load	DC to 20 kHz	20 kHz to 100 kHz
500Ω, 100 pF	±0.05%	±0.2%
5000Ω, 100 pF	±0.05%*	±0.15%
1 MΩ, 200 pF	±0.05%	±0.2%
1 MΩ, 500 pF	±0.06%	±0.4%
1 MΩ, 1000 pF	±0.08%	±0.8%
1 MΩ, 1500 pF	±0.1%	±1.2%

**±0.04%, dc to 10 kHz*

Temperature Coefficient: For 0°C to 18°C and 28°C to 50°C, add per °C below 18°C or above 28°C: dc to 20 kHz: ±(0.03 x uncertainty); 20 kHz to 100 kHz: ±(0.06 x uncertainty)

Gain Stability

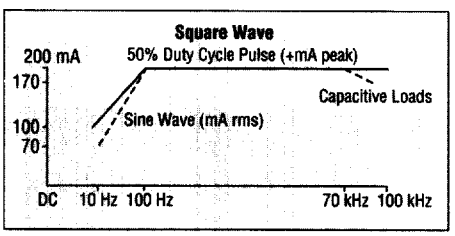
Frequency Range	Max Capacitive Load	24 Hours	6 Months
dc to 20 kHz	1500 pF	0.02%	0.06%
20 to 100 kHz	100 pF	0.08%	0.2%
20 to 100 kHz	1500 pF	0.4%	0.8%

Maximum Slew Rates:*

Maximum Load	Max Input Slew Rates	Max Output Slew Rates
200 mA Resistive	8.0V/µs	800V/µs
100 pF Capacitive	8.0V/µs	800V/µs
200 pF Capacitive	5.0V/µs	500V/µs
500 pF Capacitive	3.0V/µs	300V/µs
1000 pF Capacitive	2.0V/µs	200V/µs
1500 pF Capacitive	1.0V/µs	100V/µs

** Greater than 1000V output swing. Higher rates may trigger protection circuitry.*

Maximum Output Overshoot: Less than 4% of amplitude, with less than maximum input slew rate, and with greater than 1000V output swing
Maximum Isolation Voltage: Output common may be floated up to ±10V dc or rms ac from chassis to reduce common mode errors
Input Impedance: 10 kΩ in parallel with less than 120 pF
Input Connector: BNC, located on front panel. (Located on rear panel with Option -07)
Maximum Input Voltage: 50V dV or rms aV
Maximum Input Bias Current: 100 nA
Maximum Load Current: Bipolar symmetrical waveforms



Unipolar Rectangular Waveform:* ±200 mA peak with pulse width less than 5 msec; period greater than 10 msec.
Linearly Derating To: ±100 mA peak with pulse width greater than 50 msec; period less than 100 msec
** Referenced to zero volts. Under all circumstances, output current capability is at least ±100 mA peak*

Maximum Capacitive Load: 1500 pF, not to exceed rated load current. (Example: maximum capacitive load at 1000V, 100 kHz is 270 pF
DC Offset Voltage: ±10 mV at the output*
**90 days, 18°C to 28°C, after 1-hour warm-up*
Total Harmonic Distortion:* Resistive loads greater than 1500Ω or capacitive loads less than 1000 pF

10 Hz to 20 kHz	0.05% of setting
20 kHz to 50 kHz	0.07% of setting
50 kHz to 100 kHz	0.1% of setting

Resistive loads less than 1500Ω or capacitive loads greater than 1000 pF

10 Hz to 10 kHz	0.05% of setting
10 kHz to 20 kHz	0.1% of setting
20 kHz to 50 kHz	0.17% of setting
50 kHz to 100 kHz	0.25% of setting

**Bandwidth 10 Hz to 1 MHz*

Overload Protection: Limit protection against input noise spikes, momentary output over loads, excessive input slew rate, and excessive input frequency. Trip protection against input overdrive, steady overloads, and short circuit.
Random Noise: Less than 100 mV rms, 1 MHz bandwidth
Line-Related Noise: Less than 50 mV rms
Line Regulation: ±10 ppm of setting for 10% change in line voltage

General Specifications

Input Power: 100V, 115V, 200V, 230V ac, ±10%, internal jumper selected, 50 Hz to 60 Hz, 1800 VA at full load. Receptacle on rear panel for calibrator power
Size: 26.7 cm H x 43.2 cm W x 62.7 cm D (10.5 in H x 17 in W x 24.7 in D)
Weight: 54.5 kg (120 lb)

Included with Instrument: Instruction manual, interface cable to 5200A, serialized and dated calibration certificate

Ordering Information

Models

January 1990 prices

5205A Precision Power Amplifier $11,250
5205A-07 With Rear Input/Output 11,270

Accessories (Also see Section 17)

Y5000 Interface Buffer for 5100 Series $ 600
Y5001 Interface Cable for 5100 Series 275
Y5701 Cable, 5700A to 5205A or 5215A 250
M10-205-600 10½" Rackmount Kit 110
M00-280-610 24" Rack Slides for Rack Adapter 130

Customer Support Services

Warranty
One-year product warranty. See Section 16 for further information on warranty terms and conditions.

Extended Warranty
A 10% discount is available when you order the following at the time of the instrument purchase or when ordered within the factory warranty period.

SC1-5205A Repair ..... $ 772
SC2-5205A Calibration 462
SC3-5205A Full Service 1148
SC4-5205A Performance Verification-Plus 277

Note: Incoming and/or outgoing calibration readings are available as an option.

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