Section 1
Introduction & Specifications

1-1. INTRODUCTION

1-2. The Model 5220A is a transconductance amplifier designed to operate as either a stand alone unit or an extension of the Fluke Model 5100 Series Calibrator. Functionally, the instrument operates as a precision ac/dc current source for calibrating current shunts and/or current meters. As the name (transconductance amplifier) implies, the output current level is a function of an input control voltage. The input/output ratio is established at 1:1 so that a voltage input in the range of -20 to +20 volts will produce a proportional current output of -20 to +20 amperes. Input voltages may be either dc or ac levels depending on the output requirements. Bandwidth for ac operation is dc to 5 kHz.

1-3. Control of the 5220A can be handled locally using front panel controls or remotely by way of the 5100 Series Calibrator. (The 5100 must be equipped with a Model Y5000 Interface.) Control mode selection is accomplished using two front-panel pushbutton switches, INPUT and LOCAL. The INPUT switch allows selection of either front or rear control-voltage input connections. The LOCAL switch is used to recall the 5220A from remote to local operation.

1-4. A series of front panel indicators is used to visually display both the control and operating status of the 5220A. Control indicators include OPER (operate), STDBY (standby), FRONT input, REAR input, REMOTE, and LOCAL LOCKOUT. The combination of lit LEDs indicates the present status of the control mode. Status indicators include THERMAL CUT-OFF, OVERCOMPLIANCE, and OVERCURRENT. When any one of these indicators is lit, an overload condition has been detected causing the 5220A to switch to standby operation. All indicators are active regardless of the selected control mode, local or remote.

1-5. Current output connections are provided on both the front and rear panels. However, only one set of terminals is active. Selection of the desired set is accomplished internally and is, therefore, not considered an operator function. Neither local nor remote operation is affected by the selection of front or rear output.

1-6. Forced-air circulation is incorporated in the 5220A to ensure adequate cooling of the current output stage. Air is pulled in through a rear-panel filter, passed over the output stage heat sink, and exhausted through the unit's side panels.

1-7. The 5220A is designed to operate from ac line voltages within the range of 90V ac to 264V ac, 50 to 60 Hz. One-of-eight specific voltages (100, 110, 115, 120, 200, 220, 230, 240V ac ±10%) can be selected to ensure compatibility with the local line voltage. The selection switches are inside the 5220A. Refer to Section 4 of this manual for information on how to properly set the line power switches.

1-8. Accessories available for use with the 5220A are listed and described in Table 1-1. The rack mounting kits are designed for use with a standard 19-inch equipment rack. The Model Y5020A is a precision current shunt recommended for use in calibrating the 5220A. Specify both model number and description when ordering accessories.

1-9. SPECIFICATIONS

1-10. Specifications for the Model 5220A are given in Table 1-2.

Table 1-1. Accessories

MODEL NO.	DESCRIPTION
M07-205-600	Rack Mounting Kit
M00-260-610	Rack Slide Kit, 18-inch
M00-280-610	Rack Slide Kit, 24-inch
Y5020	Precision Shunt

Table 1-2. Specifications

CALIBRATION CYCLE	All specifications are valid for a 180-day period at an operating temperature of 20°C to 30°C and a relative humidity of 70% or less.
BASIC	
Transconductance	1 Siemen (1 ampere per volt)
Output Range	0 to 20A dc or rms ac (28.3A peak)
Compliance Voltage	⩾±4V dc, or 3V rms ac (4.25V peak)
DC Accuracy	±(0.025% of output +1 mA)
AC Accuracy	±(0.05% of output +1 mA) from 30 Hz to 1 kHz, and ±(0.05% of output +1 mA) x f from 1 kHz to 5 kHz, where f = frequency in kHz.
Short Term DC Stability	Output changes less than ±(0.005% +200 μA) in 10 minutes, with constant line, load, and temperature.
Short Term AC Stability	Output changes less than ±(0.01% +500 μA) in 10 minutes, with constant line, load, and temperature.
Harmonic Distortion and Noise	±(0.05% of output ±1 mA rms) over frequency range of 30 Hz to 1 kHz and measured with a noise bandwidth of 300 kHz, ±(0.05% of output +1 mA) x f from 1 kHz to 5 kHz, where f = frequency in kHz.
Temperature Coefficient	±(0.0025% of output +100 μA per degree C, above 30°C or below 20°C.
Transient Recovery	Output will settle to within 0.01% of final value within 2 seconds following a programmed change in output current or frequency (10 ms for 5220A alone).
DC MODE (Including 5100 Series B)	
Output Range	±1 to ±19.9999A
Accuracy of Output	±(0.025% of selected output +1 mA)
Resolution	±0.1 mA
Temperature Coefficient	±(0.003% of selected output +100 μA) in 10 minutes, with constant line, load, and temperature
Line Regulation	Output changes less than 0.001% for a ±10% change in line voltage
Load Regulation	Output changes less than ±(0.005% +100 μA) for a full load change of 4 volts of compliance.
AC MODE (Including 5100 Series B)	
Output Range	1A rms to 19.9999A rms
Accuracy of Output	±(0.07% of selected output +1 mA rms) from 50 Hz to 1 kHz, and ±(0.07% of selected output +1 mA rms) x f from 1 kHz to 5 kHz, where f = frequency in kHz.
Resolution	±0.1 mA rms
Temperature Coefficient	±(0.003% of selected output +100 μA rms) per degree C, above 30°C and below 20°C.
Short Term Stability	Output changes less than ±(0.02% +500 μA rms) in 10 minutes, with constant line, load, and temperature.
Harmonic Distortion and Noise	±(0.07% of output +1 mA rms) over frequency range of 30 Hz to 1 kHz a noise bandwidth of 300 kHz, ±(0.07% of output +1 mA) x f from 1 kHz to 5 kHz, where f = frequency in Hz.
Line Regulation	Output changes less than 0.005% for ±10% change in line voltage.
Load Regulation	Output changes less than 0.005% for each 1-volt change in compliance voltage.

GENERAL

Load Capability	Drives all resistive and capacitive loads consistent with current and compliance voltage capability. Drives inductive loads (with reduced accuracy) up to 200 microhenries, consistent with current and compliance voltage capability.
Maximum Isolation Voltage	±20V dc or 20V ac rms
Temperature Range	0°C to 50°C (operating) and −20°C to 65°C (storage).
Relative Humidity	50% to 50° C, 75% to 40°C, 95% to 25°C.
Altitude	0 to 10,000 feet (operating) and 0 to 40,000 feet (non-operating)
Vibration	2g maximum, 5 Hz to 55 Hz for 15 minutes.
Shock	15g maximum, half sinewave.
Power Requirements	100, 110, 115, 120, 200, 220, 230, or 240V ac ±10%, switch-selectable, 50 Hz to 60 Hz, 300 watts.
Weight	227 kg (50 lbs)
Dimensions	17.8 cm H x 43.2 cm W x 55.9 cm D (7" H x 17" W x 22" D), Case only, (See Figure 1-1.)
Protection Safety Class 1	Relates solely to insulation or grounding properties as defined in IEC 348.

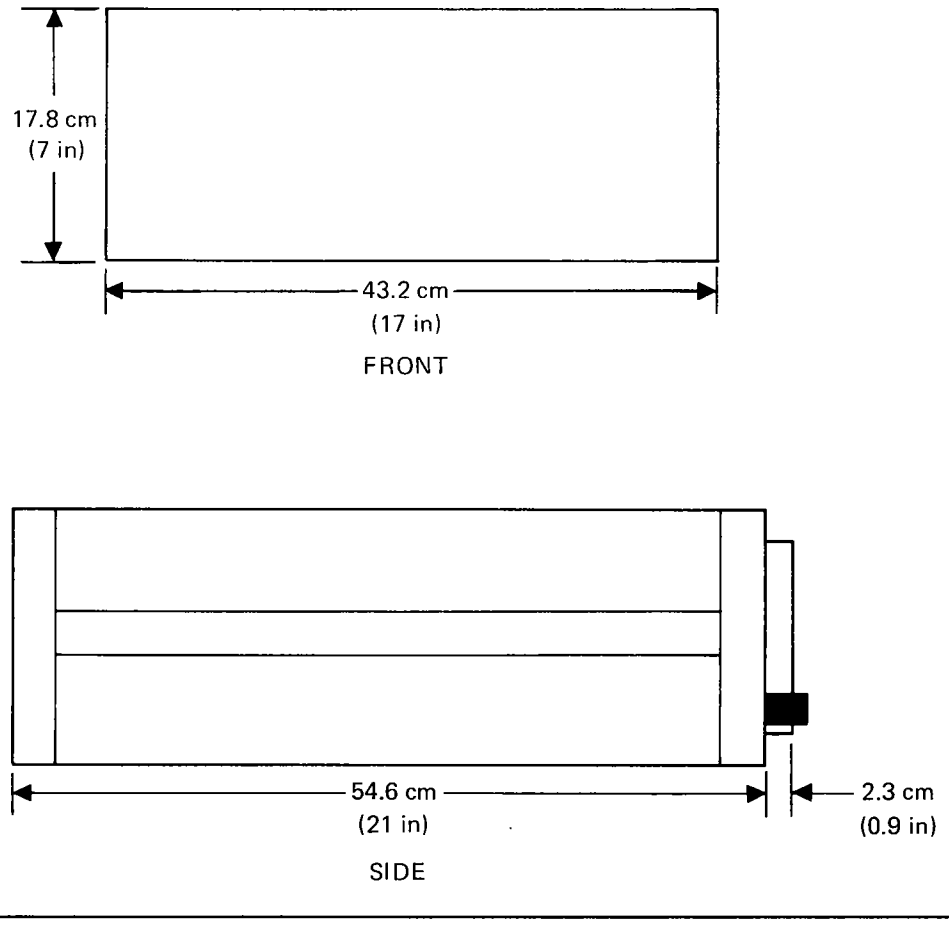

Figure 1-1. Outline Drawings