

5320A-LOAD

High Voltage Load Adapter

Instruction Sheet

Introduction

The 5320A-LOAD High Voltage Load Adapter (hereafter the Load) is designed for loading a hipot tester to create leakage current while performing hipot tester calibration with the 5320A Electrical Safety Tester Calibrator (hereafter the Calibrator). As shown in Figure 1, this Load consists of a series of eight power-rated resistors configured to provide eight resistance taps from 10 kΩ to 5 MΩ. The Load is designed to withstand a maximum voltage of 1.2 kV to 5.5 kV, depending upon the selected resistor.

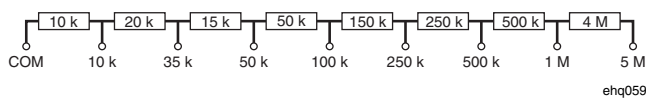


Figure 1. Load Schematic

⚠️ Warning

To avoid possible electric shock or personal injury, use this Load only as specified in this Instruction Sheet or the 5320A Calibrator Users Manual.

Preparing for Operation

The Load is shipped with a power line adapter (to run the cooling fans), a grounding cable, and this Instruction Sheet.

The power line adapter comes with five different mains plug adapters for compatibility with different power plug configurations. Prior to use, select the appropriate plug adapter which matches the local power mains outlet. After

attaching the plug to the power line adapter it is ready for use with the Load.

After placing the Load on top of the Calibrator, connect the grounding cable between the Load's rear-panel ground terminal and the Calibrator's rear-panel ground terminal.

⚠️ Warning

To avoid electric shock from high-voltage energy, ensure the ground terminal on the rear of the Load is connected to the ground (GND) terminal on the rear of the Calibrator. Any application with non-grounded housing is strictly prohibited.

⚠️ Caution

To prevent damage to the Load, ensure the vents on the bottom of the Load and the fan exhaust vents are clear of obstructions for proper cooling.

Connect one end of the power line adapter to the mating power input connector socket on the rear panel of the Load and the other end into the mains power outlet.

⚠️ Caution

Failure to have the fans operating may lead to over heating and component failure.

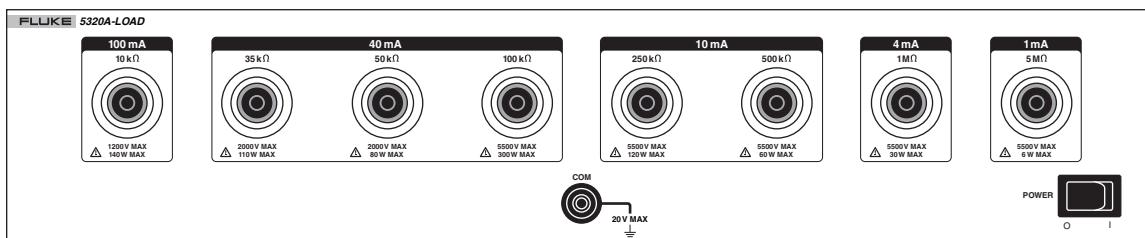


Figure 2. 5320A-LOAD Front Panel

Turn on the power to the Load’s cooling fans by pressing the front-panel power switch so the “1” side of the switch is depressed (see Figure 2). A light on the power switch illuminates to indicate that power is connected to the fans. The power switch to the fans may be turned off when the Load is no longer being used.

Using the Load for Leakage Current Testing

The Load resistor should be selected based on the appropriate voltage amplitude used for the test or the value recommended in the hipot tester’s calibration procedure.

⚠ Caution

To avoid damage, never exceed the maximum rated voltage, power, and current limit of the Load.

Usage Limits for Safe Operation

Safe operation of the load depends both on the amount of voltage and the length of time it is applied to the Load. For the 10 kΩ, 35 kΩ, 50 kΩ, 100 kΩ, and 250 kΩ resistors, the higher voltage levels have limits to the time that they can be safely applied. The maximum voltages can be applied for up to 3 minutes. Due to self heating, exceeding the 3-minute limit for high voltages may cause both degradation of performance and a permanent shift in the resistor values. However, reduced voltage levels can be safely applied for increasing longer times. At specific levels, sustained voltages can be applied indefinitely. This is graphically shown in Figure 3 for the 10 kΩ, 35 kΩ, 50 kΩ, 100 kΩ, and 250 kΩ resistor sets.

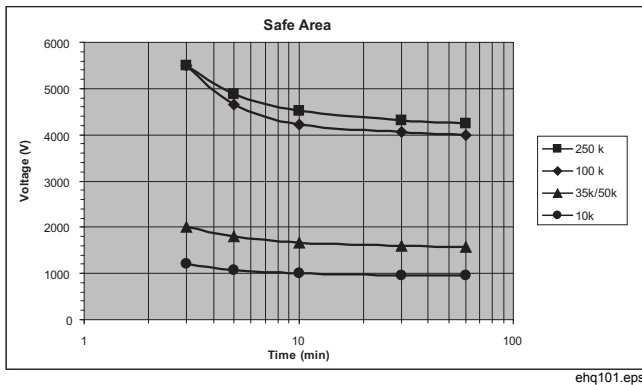


Figure 3. Safe Area Chart

As an example, the 100 kΩ resistor can withstand 5500 V for 3 minutes while it can withstand 4000 V for 60 minutes or longer.

Performance and Verification Test

With normal operation, the resistance values of the Load should be verified no less frequently than once per year. Also, the Load should be verified if there was a possibility of the resistance values changing due to excessive heating or power dissipation.

To verify the electrical performance of the Load, use one of two following test methods to insure the load resistors are within specification.

The first test method uses voltage and current levels that insure the resistors dissipate a reasonable power when being verified. The alternative second test method uses a multimeter to measure the load resistance. Both methods check to see if it is within 10 % of the nominal value. The multimeter test uses minimal voltage and current levels, dissipating negligible power when measuring the resistance values of the Load.

Either test method can be used, but the voltage method is generally recommended as it verifies the resistance value while the resistor is dissipating actual power – similar to the normal usage of the Load. The voltage method signal levels are based on capabilities of the recommended voltage calibrators. These levels use voltages up to 1 kV. It is possible and acceptable to test using other sources to test at higher voltages, but staying within the limits of the Load’s safe area of operation.

Table 1 lists the load resistance nominal value for each test terminal.

The voltage test method requires applying a test voltage across each resistance, between the respective input and COM terminals. The resulting current through the resistor is measured, and the value of the resistance is calculated. A calibrator is used as the precision voltage source. A multimeter is recommended to measure the current. Figure 4 shows the test equipment setup. Refer to Table 1 for the respective sourced voltage level settings and the nominal currents to be measured.

Note

A Fluke 5520A or 5500A Calibrator is recommended as a source for the voltage method due to its output voltage/current capabilities. A Fluke 8845A Digital Multimeter (or equivalent) is recommended for measurements with either test method.

For the voltage test method, test each resistor as follows:

1. Apply the recommended voltage at power mains frequency (either 50 or 60 Hz) between the terminal for the resistor being measured and the COM terminal.
2. Measure the current flowing through the load.
3. Calculate the resistance by dividing the sourced voltage by the measured current ($R_L = V_s / I_m$).

The calculated resistance should be within 10 % of the nominal resistance value found in Table 1.

Repeat steps 1 through 3 for each Load resistor terminal, adjusting the applied voltage per Table 1.

For the alternative multimeter test method, measure each resistor as follows:

1. Place the probes of a multimeter between the selected resistor input terminal and the COM terminal.
2. Read the measured resistor using the resistance mode of the multimeter, and note the value.
3. Insure the measured value is within 10 % of the nominal resistance.

Repeat steps 1 through 3 for each Load resistor terminal per Table 1.

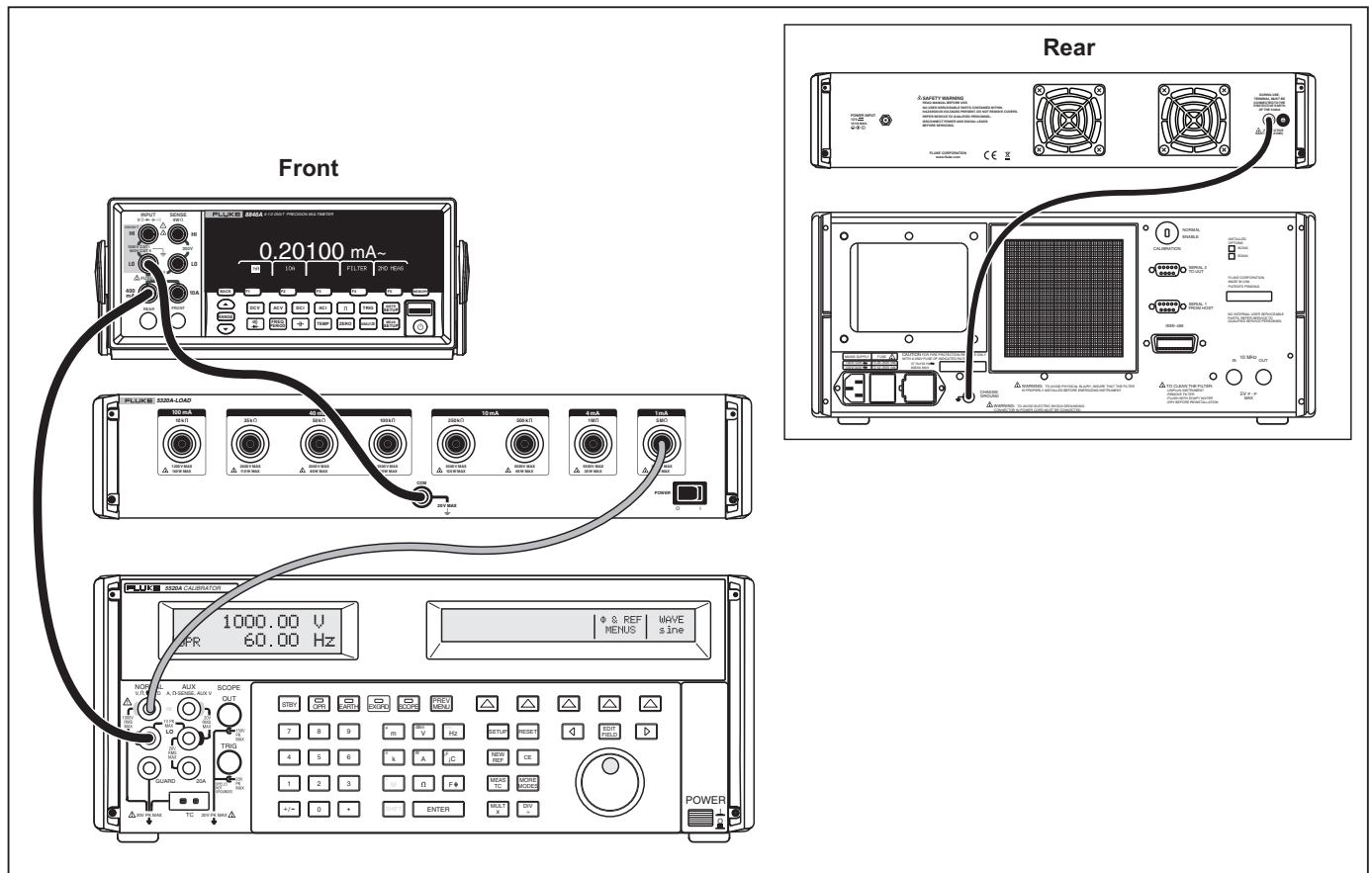


Figure 4. Test Equipment Connections for Alternate Test Method

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Table 1. 5320-LOAD Resistance Verification Values

Nominal Resistance Value	Voltage Method – Verifying the Load Resistances while under Power				Alternative DMM Verification Method
	Externally Applied Test Voltage at mains Frequency	Nominally Required Test Current	Measured Current	Calculated Resistance $R_L=V_s/I_m$ ($\pm 10\%$ of nominal)	Measured Resistance ($\pm 10\%$ of nominal)
10 k Ω	200 Vac	20 mA			
35 k Ω	315 Vac	9 mA			
50 k Ω	300 Vac	6 mA			
100 k Ω	600 Vac	6 mA			
250 k Ω	1000 Vac	4 mA			
500 k Ω	1000 Vac	2 mA			
1 M Ω	1000 Vac	1 mA			
5 M Ω	1000 Vac	0.2 mA			

Replaceable Parts

Table 2 lists the replaceable parts for the Load. To contact Fluke, visit Fluke’s website at www.fluke.com or call one of the following numbers:

USA and Canada: 1-888-99-FLUKE (1-888-993-5853)
 Europe: +31 402-675-200
 Japan: +81-3-3434-0181
 China: +86-10-6512-3435-2
 Singapore: +65 6799-5588
 Anywhere in the world: +1-425-446-5500

Table 2. Replaceable Parts

Description	Fluke PN
POWER ADAPTER 100-240V AC, 12 V DC, with five plug adapters	3132484
GROUNDING CABLE	3132491

General Specifications

Power supply voltage..... AC adapter 100-240 V, output voltage 12 V @ 0.4 amps min.
Warm-up time..... Not applicable
Specifications confidence level 99 %
Temperature
 Operating Temperature 5 °C to 40 °C
 Recommended Calibration Temperature (Tcal) . 23 °C
 Storage Temperature -20 °C to +70 °C
Altitude, Maximum
 Operating..... 3,050 m (10,000 ft)
 Storage 12,200 m (40,000 ft)
Dimensions 430 mm X 462 mm X 95 mm (16.9 in X 18.2 in X 3.7 in)

Weight (net) 3 kg (8 lb 4.5 oz)
Power Consumption 5 W maximum
Safety class I according to EN 61010-1

Electrical Specifications

Total resistance range 10 k Ω to 5 M Ω
Number of specific resistance values 8
Tolerance to Nominal Value 10 % (One year, Tcal \pm 5 $^{\circ}$ C)

Maximum Ratings

Nominal Value	Max. Voltage	Max. Dissipation Power	Max. Time at Maximum Power
10 k Ω	1200 V	140 W	Limited to 3 minutes (see Figure 3)
35 k Ω	2000 V	110 W	Limited to 3 minutes (see Figure 3)
50 k Ω	2000 V	80 W	Limited to 3 minutes (see Figure 3)
100 k Ω	5500 V	300 W	Limited to 3 minutes (see Figure 3)
250 k Ω	5500 V	120 W	Limited to 3 minutes (see Figure 3)
500 k Ω	5500 V	60 W	No limit
1 M Ω	5500 V	30 W	No limit
5 M Ω	5500 V	5 W	No limit

