



Digital Multimeter Damage Prevention

Performing measurements with a digital multimeter (DMM) is very common in today's world. Technicians use multimeters for equipment servicing, engineers use multimeters to troubleshoot, students use multimeters for lab research, and so on. Since digital multimeters have many functions, you need to know how to properly use your multimeter. Most multimeter failures are caused by improper use.

Learn 4 tips to avoid damaging your digital multimeter.



1. Read the warning labels and specifications
2. Ensure proper grounding
3. Avoid overpowering the digital multimeter
4. Check for proper temperature and humidity

1. Read the Warning Labels and Specifications

Before you begin taking measurements with your digital multimeter, read the warning labels and specifications. Do not exceed the values provided in the specifications guide or as indicated by the yellow warning labels on the instrument.

Always refer to the specification guide for conditions required to meet the listed specification.

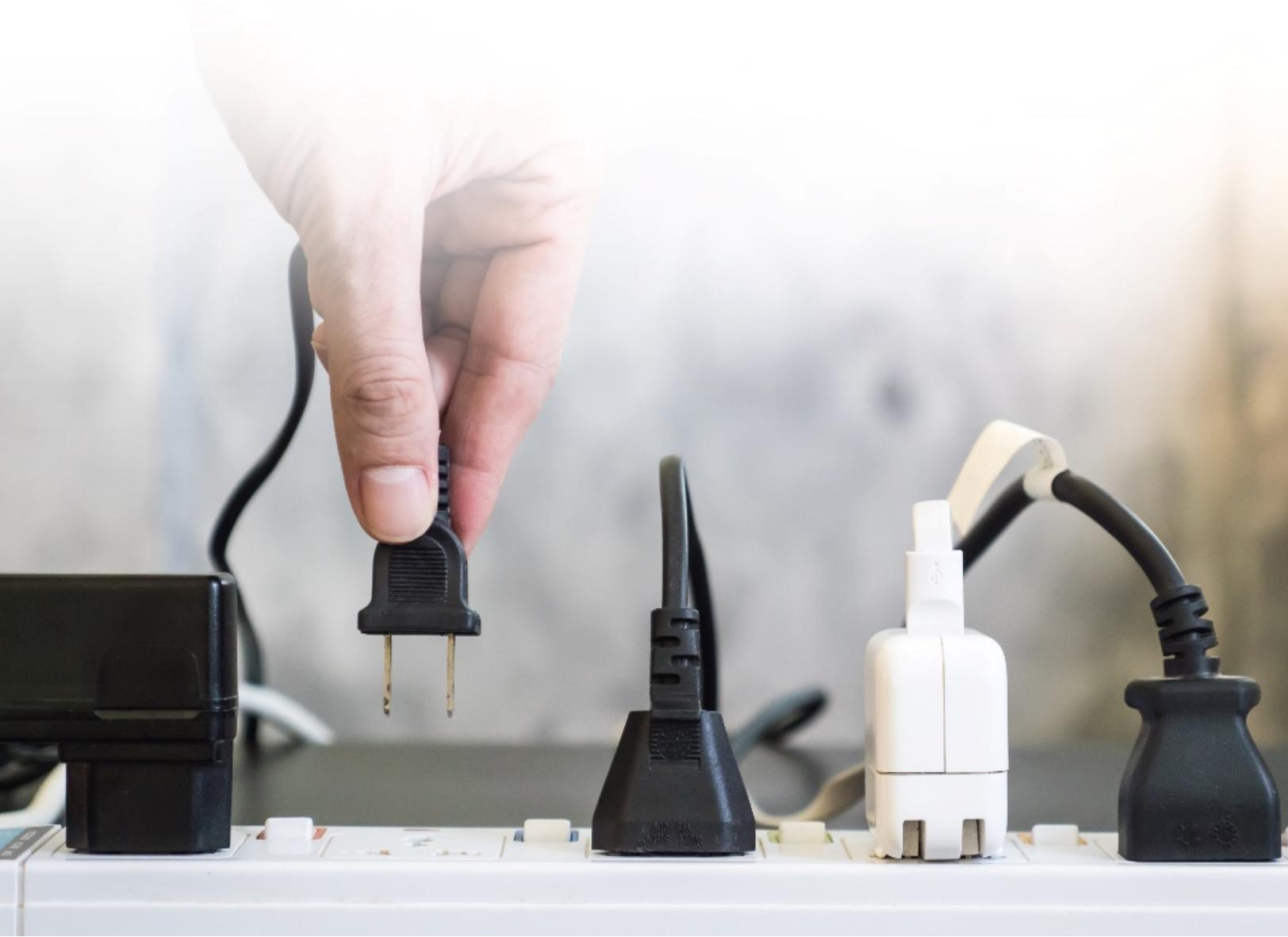


Figure 1: Example of the 34470A digital multimeter's rear panel showing warnings on the maximum voltage input and maximum current input

2. Ensure Proper Grounding

Always use the three-prong AC power cord supplied with the instrument. Proper grounding of the instrument will prevent a build-up of electrostatic charge that may be harmful to the instrument and you. Do not damage the earth-grounding protection by using an extension cable, power cable, or autotransformer without a protective ground conductor.

It is good to check the AC power quality and polarity; Typical required AC voltage is 100 V, 120 V, 220 V \pm 10%, or 240 V +5%/-10%. Typical expected grounding wire resistance is $< 1 \Omega$; The voltage between neutral and ground line is < 1 V. If needed, install uninterruptible power supply [UPS] to power your meter.



3. Avoid Overpowering the Digital Multimeter

Avoid damaging your digital multimeter by anticipating the signal level you'll measure and presetting the proper signal range on the DMM. Overpowering the digital multimeter can damage the components inside the meter.



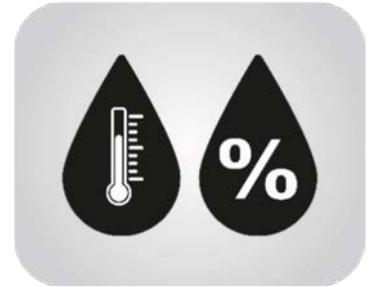
Figure 1: The 34470A digital multimeter's front panel shows warnings that the maximum voltage input is 1000 VDC and 750 VAC.

Before you turn on or off the connected equipment or the DUT, reduce the signal level to the minimum safety level. This prevents unexpected voltage or current swell or sag from affecting your instrument's input or output.

4. Check for Proper Temperature and Humidity

You need to keep your multimeter in a clean and dry environment. Typical temperature for storage condition is between -40°C and 75°C ; Typical humidity is $< 95\%$ RH. The DMM's optimal operating temperature should be from -5°C to 23°C .

You also need to ensure proper ventilation among racks so the temperature does not go up if all instruments are in use at same time. You should also frequently inspect and clean the cooling vents and fans.



Conclusion

It's important to take good care of your instrument. Using your instrument properly helps you and your organization save on maintenance costs. Therefore, it is always good to know the basic tips mentioned above to prevent damage to your multimeter.

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