

Changing the Fuse in the V79 Multimeter

WARNING!

Static discharge can destroy your meter. The ECE department will not be responsible for meter abuse. If you have any doubts of your ability to perform this procedure, consult with a Teaching Assistant in OpEL, located in Whittemore 219.

Introduction

When the user exceeds the current capacity of the V79 Multimeter, an internal fuse opens to protect the precision current shunt. Typically, this occurs when the user leaves the multimeter in current measuring mode and places the probes across a voltage source.

Items Needed:

- V79 Multimeter (OPTIONAL: Multimeter Test Leads)
- Phillips Head Screw Driver
- Replacement Fuse



Figure 1: Phillips Head Screw Driver



Figure 2: Express V79 Multimeter



Figure 3: Appropriately rated, intact, spare fuse

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Begin to separate the V79 Multimeter from its blue, rubber casing, as seen in Figure 4 below. Pry the top of the meter first, so that the plastic stand on the back of the meter does not get stuck and damaged.



Figure 4: Rubber casing being removed from the multimeter



Figure 5: V79 Multimeter and rubber casing completely separated

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After the rubber case and multimeter has been separated, flip over the multimeter to locate the single philips-head screw at the bottom of the meter. Circled below in Figure 6.



Figure 6: V79 Multimeter flipped over to expose back screw

Using a Phillips head screwdriver, gently place the tip of the screwdriver onto the head of the screw and rotate it counter-clockwise to loosen the screw. Seen below in Figure 7.

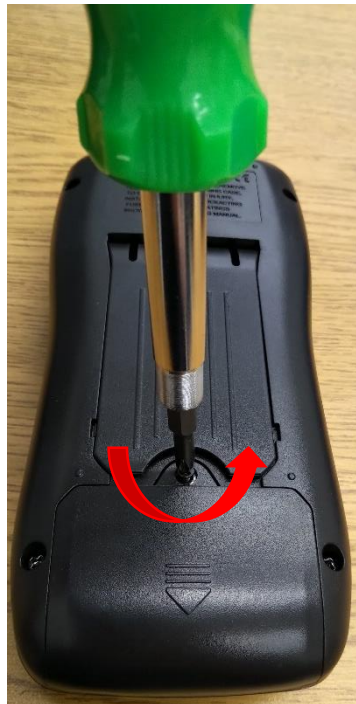


Figure 7: Phillips head screwdriver placed onto the screw

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After the screw has been loosened fully, remove it and remove the black cover from the bottom of the multimeter by following the arrow imprinted on it and slide the cover down, seen below in Figure 8.



Figure 8: Black cover removed from bottom of V79 Multimeter

Carefully remove the battery from the V79 Multimeter by gently lifting up on it in a corner. Remember it is still connected to the multimeter, so do not aggressively force it up. The blue tab that holds the battery terminals can be seen below in Figure 9.



Figure 9: Battery lifted up out of its housing, still connected by the blue terminal tab

Proceed to gently remove the battery from the terminals of the blue tab. Be careful not to bend any of the metal on the terminals, as they will not conform to the battery again after being bent. The separated battery and blue tab can be seen below in Figure 10 on the following page.

IT IS IMPORTANT TO DISCONNECT THE POWER SOURCE WHEN WORKING WITH ANY TYPE OF ELECTRICAL EQUIPMENT

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Figure 10: Separated battery and blue terminal tab

Place the battery off to the side for later when it is time to put the V79 Multimeter back together. This would be an optimal time to change the battery if that service is needed as well. Proper multimeter maintenance is an essential part of owning a multimeter in the first place!



Figure 11: Removed battery and exposed fuse

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Using one of your test probes, very carefully insert the tip of the probe below one end of the fuse. Be careful not to force the tip too far in and damage either the metal tabs the fuse is sitting on, or to break the glass of the fuse itself. A probe being inserted can be seen below in Figure 12.

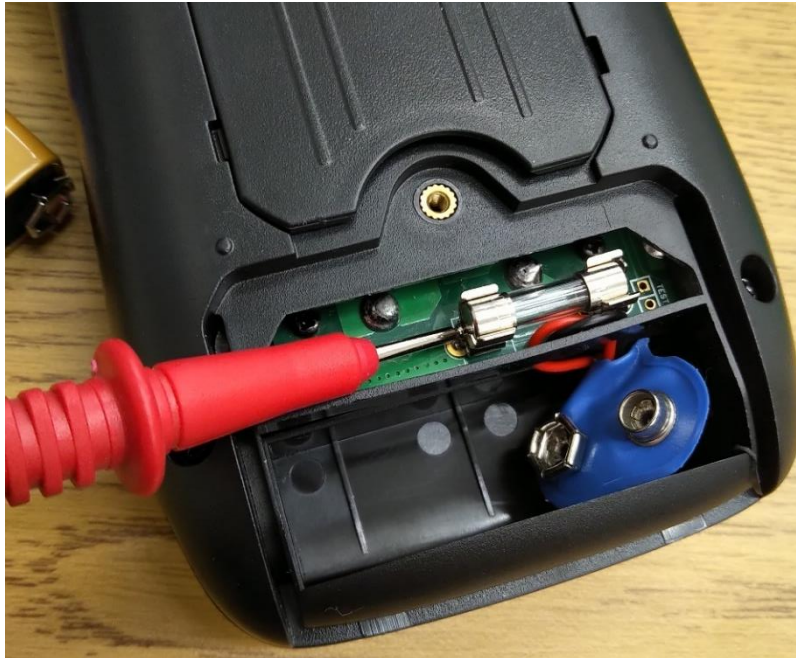


Figure 12: Tip of probe inserted at an angle below the end of the fuse

Once the fuse has become free of the tab, place aside your test probe and gently grasp the exposed fuse with two fingers. Lift the fuse so that it is removed from the V79 Multimeter. The freed fuse can be seen below in Figure 13.



Figure 13: Freed fuse after being pried up by the tip of the probe.

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Replace the broken fuse with an equivalent fuse (there should've been a bag of fuses included in your kit). There is no need for tools when putting the fuse back into the multimeter. Just line up the fuse and apply gentle pressure to secure the fuse. If you cannot push the fuse back into place, try securing one end first then securing the other. The replaced fuse can be seen below in Figure 14.



Figure 14: The replaced fuse in the multimeter, it has already been set

After the fuse has been set, it's time to put the battery back in. Be sure to attach the blue tabbed terminals to the correct battery terminals. Be sure not to twist the positive and negative (red and black) wires of the blue tab. It is bad for the wire and it will be harder to set the battery. The terminal connections can be seen below in Figure 15.



Figure 15: The appropriate battery connections

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It may take several attempts to safely and neatly place the battery back into its slot. Be careful that when you sit the battery all the way down that the terminals do not come loose or disconnect from the blue tab. A loose or poor connection can result in a damaged multimeter. As seen below in Figure 16, there is little room for error.



Figure 16: The battery securely placed back into its spot

After the fuse and battery are both secured in their place, it is time to put the cover of the compartment back onto the Multimeter. Slide the black cover back onto the Multimeter being sure to even the sides of the cover in the track. This can be seen below in Figure 17.



Figure 17: Sliding the cover back onto the multimeter

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After the cover is back in place, put the Phillipshead screw back into the slot and use the Phillipshead screwdriver to secure the cover. Gently turn the screwdriver in a clock-wise rotation until the screw is firmly in place. Do not over tighten the screw in fear of stripping the screw or the head of the screw! The process of tightening the screw can be seen below in Figure 18.



Figure 18: Tightening the screw by turning the screwdriver in a clock-wise rotation

After the cover is secured, you can begin to put the rubber casing back onto the multimeter. It is easier to slip on the top of the rubber case first, seen below in Figure 19.



Figure 19: The top of the rubber case is slipped onto the meter first

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Continue to put the rest of the rubber casing back onto the multimeter. I found that it worked best to use two fingers to ease the rubber casing back on, for it might be a little resilient to flex. This can be seen below in Figure 20.



Figure 20: Using two fingers to slide the rest of the rubber casing back onto the multimeter

Congratulations! After slipping the rubber casing back onto the multimeter, you should be finished! Turn the multimeter on to make sure that the battery is connected and that the meter is functioning.

Using a known test condition, it is recommended to make sure that the ammeter aspect of the multimeter is now functioning again. Make sure not to blow the fuse you've just replaced!

If anything of this guide is unclear, or you have run into any issues throughout the process, remember that you can ask for assistance from any TA in the OpEL lab in Whittemore 219!

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Figure 21: The finished product: the V79 Multimeter put back together with a replaced fuse.