

# Digital Multi-meter (DMM) Tutorial

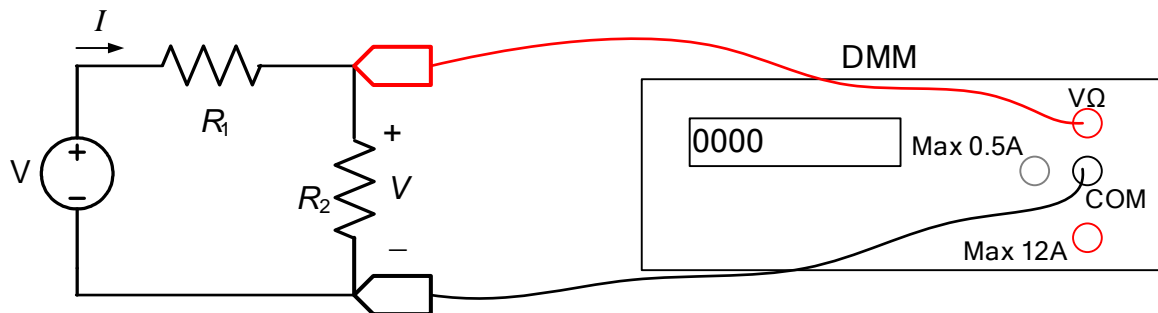
## GwInstek GDM-8341



### Voltage

To measure a voltage, do the following:

1. Connect the DMM across the voltage that you want to measure using the red V $\Omega$  terminal and the black COM terminal. The red terminal should be connected to the positive side of the voltage  $V$  as shown below.



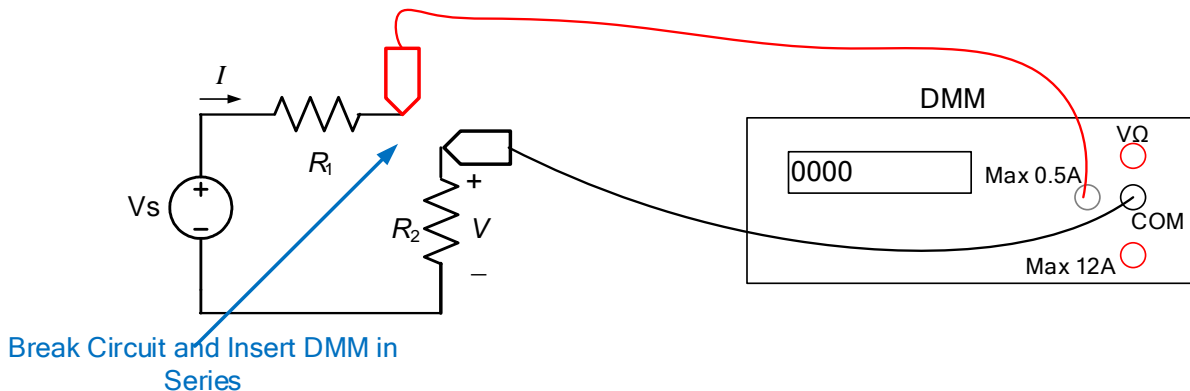
2. Select DC volts or AC volts:
  - a. To measure DC volts, which is also called the DC offset or the average value, press the DCV button.
  - b. To measure AC volts, which is also called the RMS value, press the ACV button.
3. The range is the highest value that the DMM can measure for a given setting. To have the DMM automatically select the range, press the Auto button. To select a range manually, press the Range+ or Range- buttons. The current range is shown on the right of the screen.

## Current

To measure a current, do the following:

1. Break the circuit and connect the DMM in series with the element that has the current that you want to measure. If you are going to measure a current that is less than 0.5A, which is always the case in this course, use the white Max 0.5A terminal and connect it so that the current goes into that port as shown below for the current  $I$ . (For currents greater than 0.5A, use the red 12A port and manually set the range to 5A or 10A.)

Since the DMM behaves like a short circuit when measuring current, be VERY careful not to connect the leads directly across the power supply because the current could exceed 0.5A and burn out a fuse in the DMM. If the meter reads 0 A (or very close to 0 A), the fuse may be burned out, in which case ask for assistance.

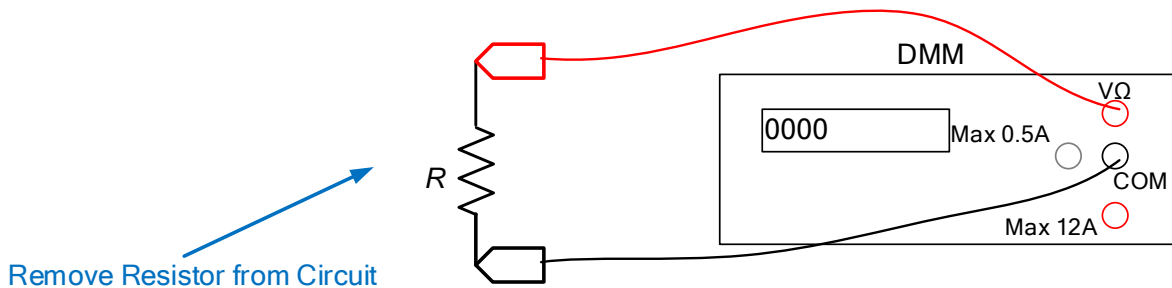


2. Select DC amps or AC amps:
  - a. To measure DC amps, which is also called the DC value or the average value, press the Shift button and then press the button that has DCI written above it.
  - b. To measure AC amps, which is also called the RMS value, press the Shift button and then press the button that has ACI written above it.
3. To have the DMM automatically select the range, press the Auto button. To select a range manually, press the Range+ or Range- buttons. The current range is shown on the right of the screen.

## Resistance

To measure resistance, do the following:

1. Remove the resistor from the circuit and connect the DMM across the resistor using the red V $\Omega$  and the black COM terminals.



2. Select resistance mode by pressing the “ $\Omega$ ” button.
3. To have the DMM automatically select the range, press the Auto button. To select a range manually, press the Range+ or Range- buttons. If the resistance is greater than the range, then the DMM displays “0.L”.
4. If you press the “ $\Omega$ ” button again, the DMM enters connectivity mode where it beeps if the resistance is small (close to a short circuit). This mode is useful when checking a circuit to see if it is connected correctly because you don’t need to keep looking up from the circuit to see if two points are connected. When it is in this mode, the DMM displays “CONT” on the right side of the display.

## Oh No, Our DMM Won’t Switch Modes!

If the DMM won’t switch between voltage, current, and resistance modes, push and hold the 2ND button.

## Update Speed

The rate that the display is updated can be changed by pressing the left and right arrow buttons. There are three modes, fast (F), medium (M), and slow (S).

## Grounding

Unlike the oscilloscope, the COM lead on the DMM can be connected anywhere in a circuit because it is not connected to ground internally by the DMM. So we can measure a voltage with respect to any node in a circuit, not just with respect to ground. In a similar way, we can measure current anywhere in the circuit.