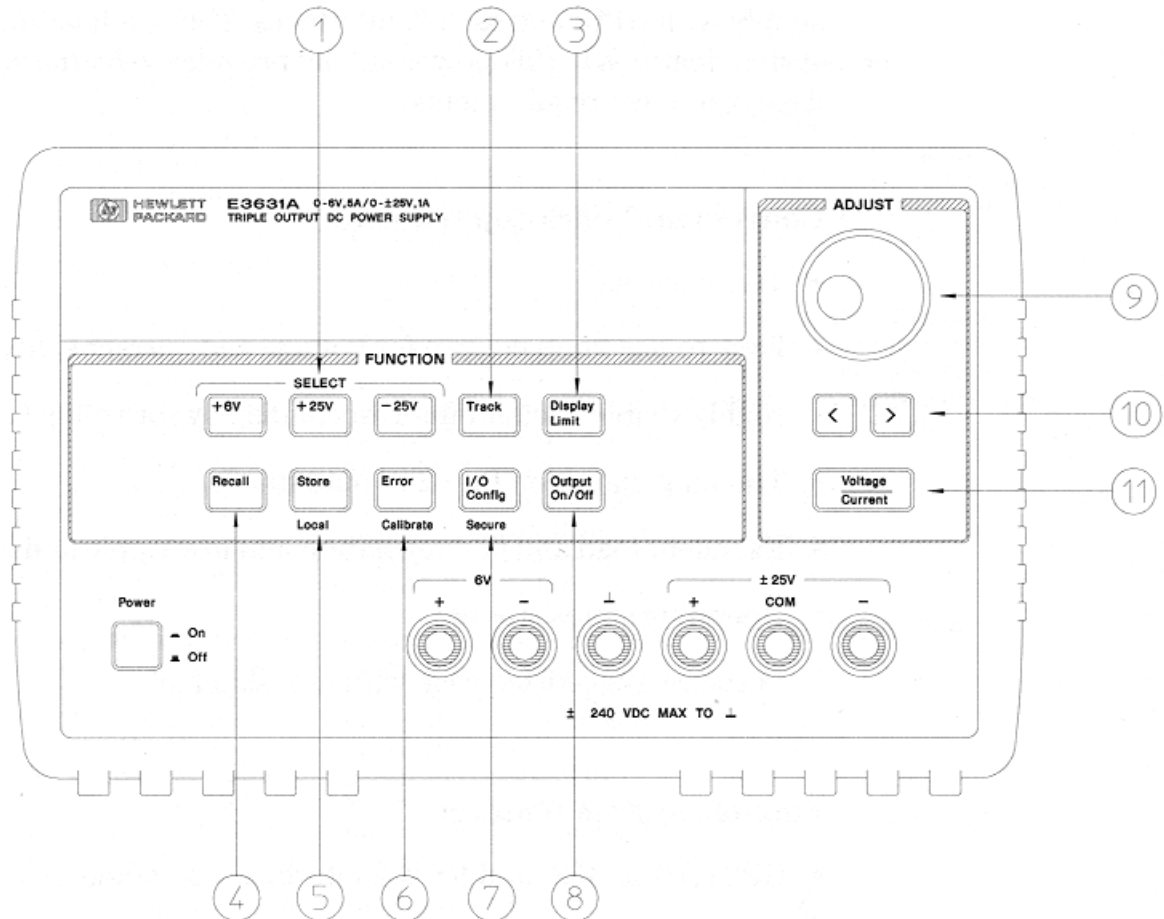


Excerpts from: "An Introduction to Using the Agilent 54622D Digital Oscilloscope, E3631A DC Power Supply, 34401A Digital Multimeter, and 33220A Arbitrary Waveform Generator"
 by Walter Banzhaf, University of Hartford, Ward College of Technology, USA

Part Three - The Agilent E3631A Power Supply

1. Setting the Output Voltage
2. Setting the Current Limit

Part Three – The Agilent E3631A Power Supply



- | | |
|-----------------------------------|---|
| 1 Meter and adjust selection keys | 7 I/O Configuration / Secure key |
| 2 Tracking enable/disable key | 8 Output On/Off key |
| 3 Display limit key | 9 Control knob |
| 4 Recall operating state key | 10 Resolution selection keys |
| 5 Store operating state/Local key | 11 Voltage/current adjust selection key |
| 6 Error/Calibrate key | |

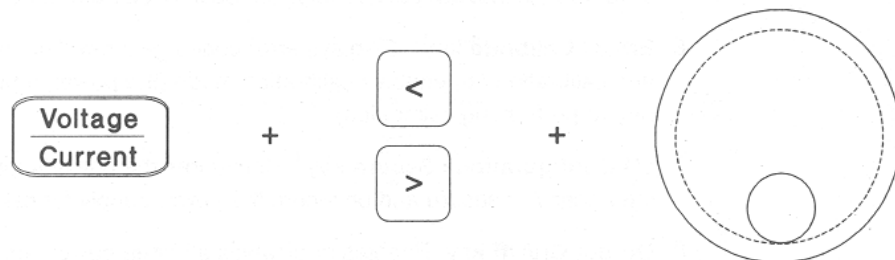
A power supply is used to provide DC voltage(s) needed by a circuit that doesn't supply its own power. The Agilent E3631A is actually three power supplies: 0 to 6 V, 0 to 25 V, and 0 to -25 V. In this section you will see how to set the voltage of

each supply and how to use "current limiting" on each supply to protect your circuit.

Setting the voltage limit is quite simple to do, and to understand. Refer to the front panel picture on the previous page, and the instructions below.

You can set the voltage and current limit values from the front panel using the following method.

Use the voltage/current adjust selection key, the resolution selection keys, and the control knob to change the monitoring or limiting value of voltage or current.



- 1 Press the **Display Limit** key after turning on the power supply.
- 2 Set the knob to the voltage control mode or current control mode using the voltage/current adjust selection key.
- 3 Move the blinking digit to the appropriate position using the resolution selection keys.
- 4 Change the blinking digit to the desired value using the control knob.
- 5 Press the **Output On/Off** key to enable the output. After about 5 seconds, the display will go to the output monitor mode automatically to display the voltage and current at the output.

Setting the Output Voltage:

Let's say you have built a circuit that needs +5 V. So, you follow the process above to set the +6 V supply to +5.000 V. Do this now, and verify that the output voltage is 5.000 V.

Or, your circuit needs +/- 15 V, in which case you follow the process above to set the +25 V supply to +15.00 V, and the -25 V supply to -15.00 V. Do this now, and verify that the voltages are +15 V and -15 V (both measured with respect to the black COM terminal).

However, taking the time to also set the current limit can be a really smart precaution, in case a wiring error, defective component, or accidental connection

(e.g. bridging two pins on an IC) during testing would cause excessive current to flow and damage your circuit. The +6 V supply can source 5 amperes, and the +/- 25 V supplies can source 1 amp; this is a substantial amount of current, and can create a lot of smoke and damage to components in your circuit.

Setting the Current Limit:

- 1) Let's assume you have set the +6 V supply to 5.000V, and the display indicates you have the +6 V supply selected. To set the current limit, press the **Display Limit** button, then the **Voltage/Current** button. Use the control knob and the "Resolution Selection Keys" (the < and > keys underneath the control knob) to adjust the current limit to 0.020 A.
- 2) This setting of 0.020 A means that no matter what you do, the current from the +6 V supply (which is now set to 5.000 V) will never exceed 20 mA. Let's verify that two ways: with a short circuit, and with an LED.
- 3) First, note the voltage and current displays: the voltage is very close to 5.000 V, and the current is 0.000A (since nothing is connected to the + and - terminals of the 6 V supply). Also, at the right side of the display a "CV" is showing; this means the supply is in "Constant Voltage" mode, and will maintain 5.000 V *unless* the current reaches 20 mA, in which case the output voltage will drop to whatever value is needed to keep the current at 20 mA.
- 4) Connect a jumper wire (or alligator lead) between the + and - terminals of the 6 V supply. Note the voltage is 0.000 V, the current is close to 20 mA, and the "CV" has been replaced by "CC" ("Constant Current").
- 5) Now let's try this with an inexpensive LED. Connect an LED with the anode to the plus terminal, and the cathode to the minus terminal, of the 6 V supply (which is set to 5.000 V). Normally, without current limiting, an LED will be quickly destroyed by this procedure. What happens to your LED?

What is the output voltage (it should be around 2.0 V, depending on the color of the LED)? What is the current (it should be near 20 mA). Your LED is emitting light, and will live to see another day, because the current limiting circuit protected it by lowering the voltage.

- 6) If you don't mind destroying an LED, you can see the effects of ***not using current limiting***. Turn the power supply off, then turn it on again. Set the +6 V supply to 5.000 V, and again connect the LED to the + and - terminals. What happened? LEDs will either burn out, or will get really hot (don't burn yourself on the leads of the LED).

This power supply has many useful features, including remote control and the ability to store and recall three setups from nonvolatile memory. Look in the Agilent manual for this instrument for complete information.