

Lesson 18

EET 150

Operating a Function Generator



Learning Objectives

- ▣ In this lesson you will:
- ▣ see the types of waveforms produced by a function generator
- ▣ see the basic controls of a function generator operation
- ▣ identify key function generator specifications
- ▣ see the how source and load resistance affect generator operation
- ▣ locate and identify the basic control groups of a function generator



Operating a Function Generator

A Function Generator

- produces sine, square, pulse, triangle and ramp waveforms
- has a variable frequency output
- has adjustable voltage amplitude output
- can add a dc offset to any waveform



Characteristics of a Function Generator

Generator Specifications

Frequency range: 0.000,001 Hz -20 MHz (lab instrument)

Amplitude range: 10 mV_{pp}-10 V_{pp} (lab instrument)

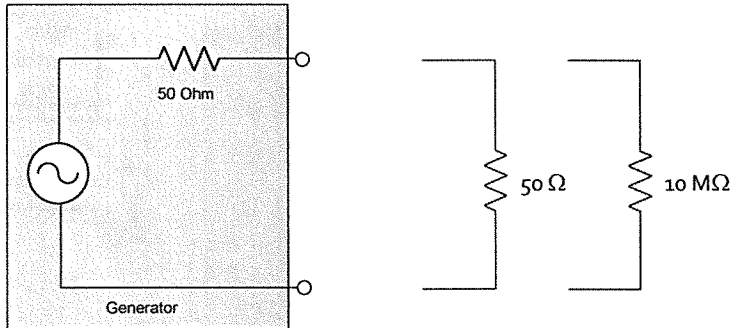
Total harmonic distortion: sine and other waves lower better

Output impedance: typical 50 ohms (variable on lab instrument)



Generator Output Impedances

Voltage and Power Transfer



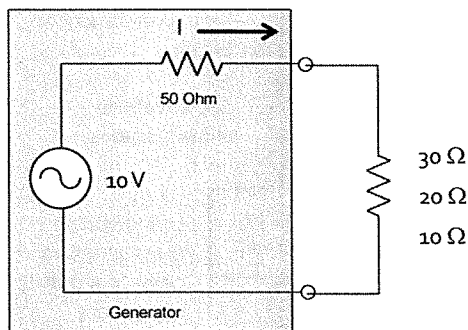
Match load to generator resistance for maximum power

Use high resistance load to get maximum voltage



Function Generator Output

Power limits and short circuits



$$I = \frac{10\text{ V}}{80\ \Omega} = 0.125\text{ A}$$

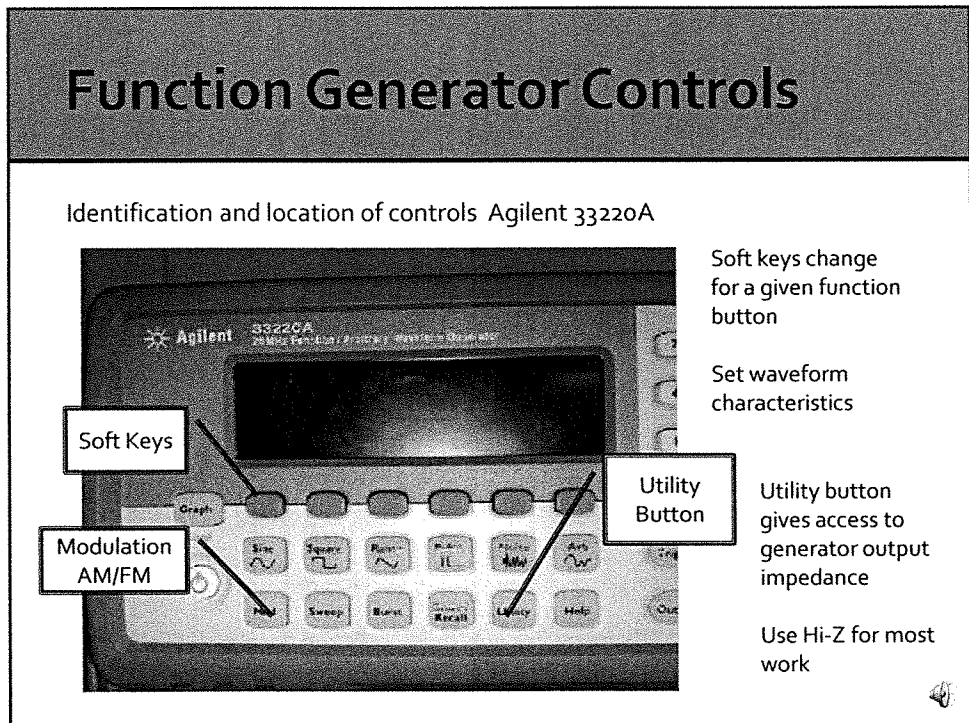
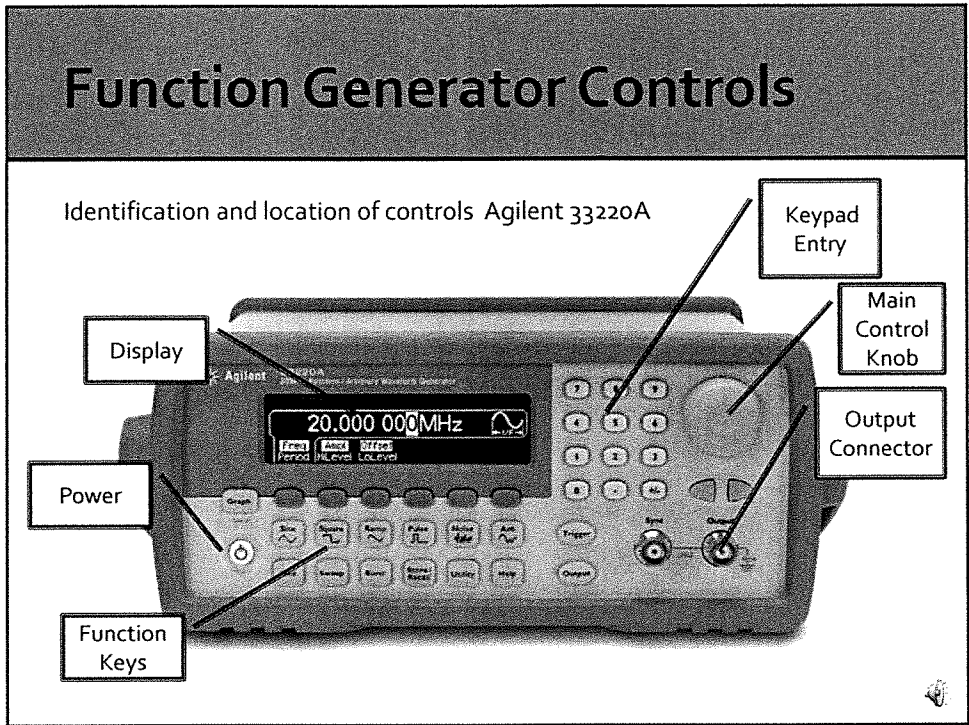
$$I = \frac{10\text{ V}}{70\ \Omega} = 0.143\text{ A}$$

$$I = \frac{10\text{ V}}{60\ \Omega} = 0.167\text{ A}$$

$$I = \frac{10\text{ V}}{50\ \Omega} = 0.200\text{ A}$$

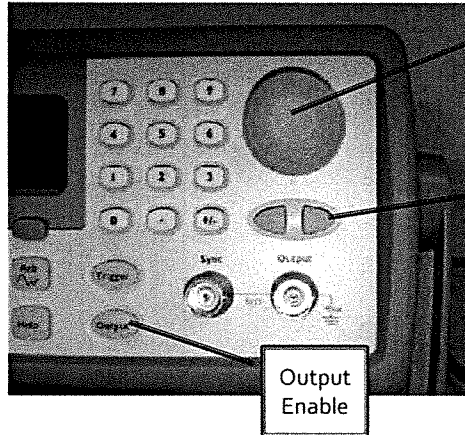
Short circuit limited by generator internal resistance





Function Generator Controls

Identification and location of controls Agilent 33220A



Main Control Knob

Output enable must be pressed to see output

Display cursors control digit adjustment

Display Cursor Controls

Main control knob controls frequency and amplitude adjustments

Output Enable

Coming Next: Multi-stage Troubleshooting

End Lesson 18
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