

UNIT 13

WATT'S LAW

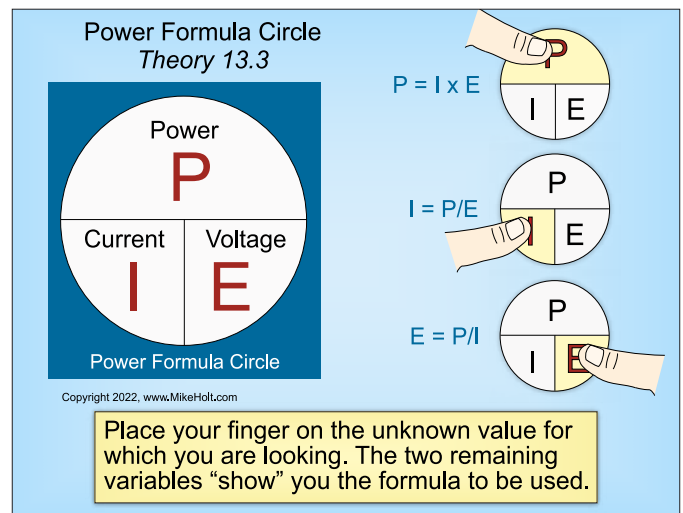
13.1 Introduction

Wattage is a measure of the amount of power that is being used in a circuit. In this unit you will learn:

- ▶ what Watt's Law is
- ▶ how to use Watt's Law
- ▶ what a wattmeter is

13.3 Power Formula Circle

The Power Formula Circle demonstrates the relationship between power, current, and voltage. To apply Watt's Law using the Power Formula Circle, place your finger on the unknown value for which you are looking and the two remaining variables "show" you the formula to be used. ▶Figure 13-3

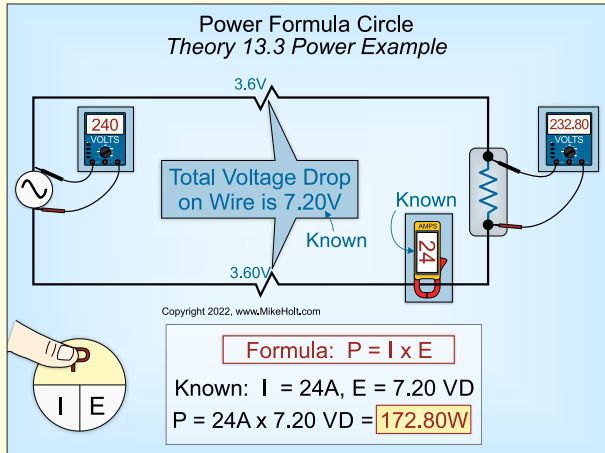


▶Figure 13-3

► Power (P) Example

Question: What is the power consumed by a circuit carrying 24A having a voltage drop of 7.20V? ►Figure 13-4

- (a) 125W (b) 175W (c) 235W (d) 350W



►Figure 13-4

Solution:

Step 1: What is the question asking you to find? What is the wire power loss? "P."

Step 2: What do you know about the wires?

$$I = 24A$$

...

$$E = 7.20 VD$$

Step 3: The formula is $P = I \times E$.

Step 4: Calculate the answer.

$$P = 24A \times 7.20 VD$$

$$P = 172.80W$$

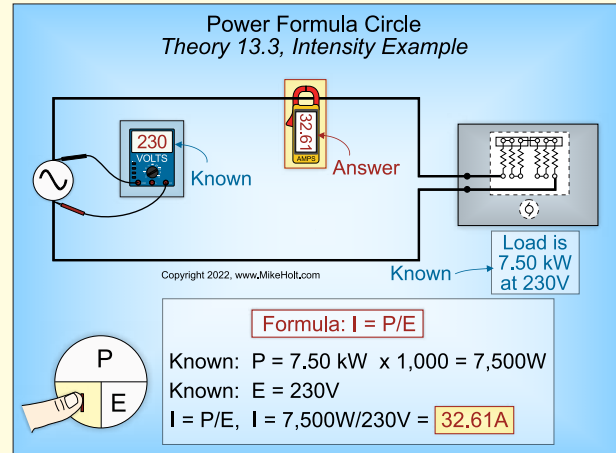
Answer: (b) 175W

► Intensity (I) Example

Question: What is the current through a 7.50 kW heat strip rated 230V?

►Figure 13-5

- (a) 25A (b) 33A (c) 39A (d) 230A



►Figure 13-5

Solution:

Step 1: What is the question? What is "I"?

Step 2: What do you know?

$$\text{Heat Strip Power Rating, } P = 7.50 kW \times 1,000$$

$$\text{Heat Strip Power Rating, } P = 7,500W$$

$$\text{Heat Strip Voltage Rating, } E = 230V$$

Step 3: The formula is $I = P/E$.

Step 4: The answer is $I = 7,500W/230V$.

Step 5: The answer is 32.61A.

Answer: (b) 33A