UNIT

22

GENERATORS

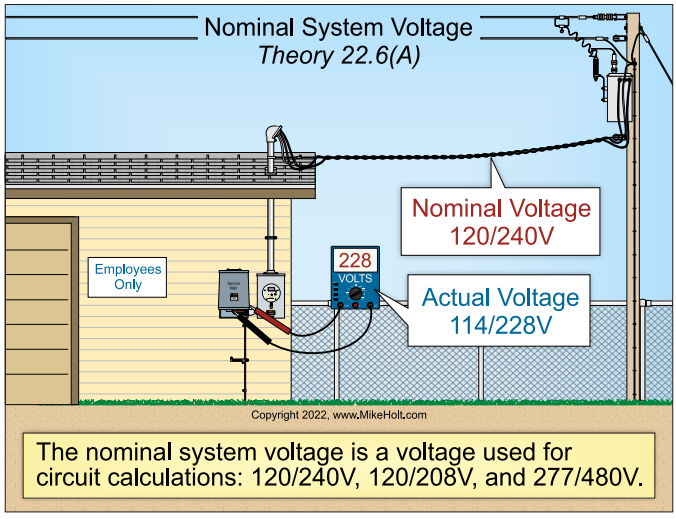
22.1 Introduction

A generator is a device that converts mechanical energy into electrical energy. Generators produce most of the electric power in the world and are used in residential, commercial, and industrial facilities for primary, backup, and temporary power. In this unit you will learn:

- generator basics
- the differences between single- and three-phase generators
- how to calculate generator output volt-amperes and amperes

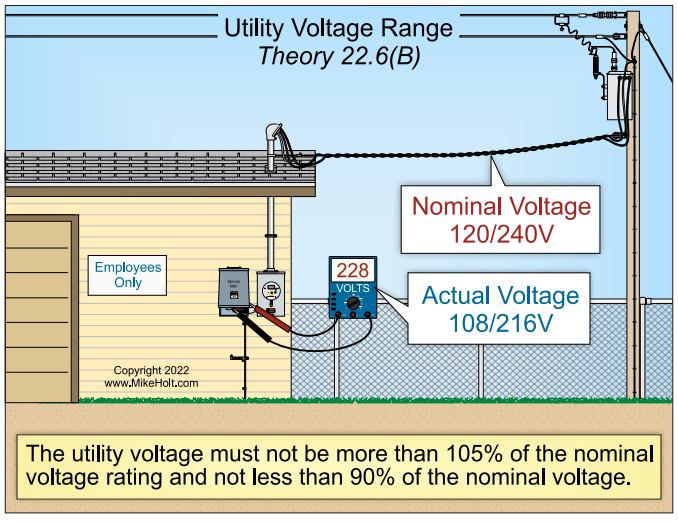
22.6 Electrical Industry Voltages

(A) Nominal System Voltage. The nominal system voltage is a voltage used for circuit calculations. For example, 120/240V, 120/208V, or 277/480V are nominal system voltages. ▶Figure 22–8



▶Figure 22–8

(B) Utility Voltage Range. In accordance with ANSI C84.1, the utility voltage must be no more than 105 percent and not less than 90 percent of the nominal system voltage. This means that for a 120/240V nominal voltage system, the utility must provide a voltage of not less than 108/216V (90 percent) or not more than 126/252V (105 percent). ▶Figure 22–9



▶Figure 22–9

(C) Actual Voltage. The actual voltage at any point in the electrical system is the voltage that is measured by a voltmeter. ▶Figure 22–10

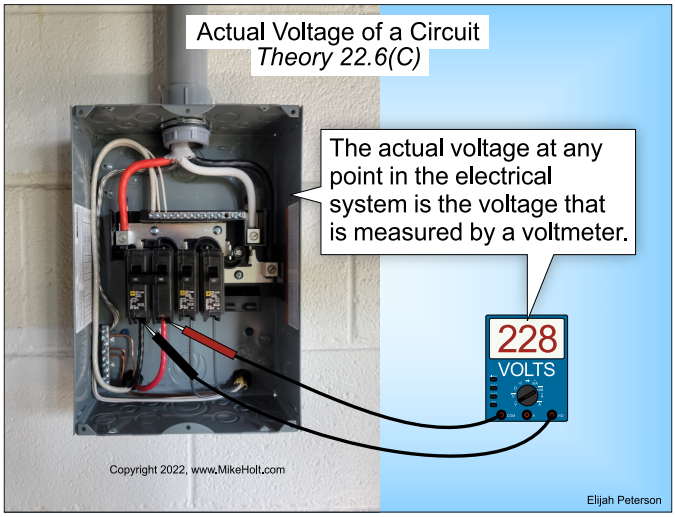


Figure 22–10

(D) Equipment Voltage Rating.

(1) Minimum Electrical Equipment Voltage. Equipment must be connected to a nominal system voltage per their specifications. In accordance with ANSI C84.1, the minimum voltage at the equipment cannot be less than 90 percent of the nominal system voltage.

(2) Minimum Motor Voltage. Motors must be connected to a nominal voltage in accordance with their specifications. In accordance with the NEMA MG1-standard, the minimum voltage at the motor cannot be less than 90 percent of the motor's nameplate voltage rating.