

Electrical Level 4



Health Care Facilities 26402-14



Objectives

When trainees have completed this lesson, they should be able to do the following:

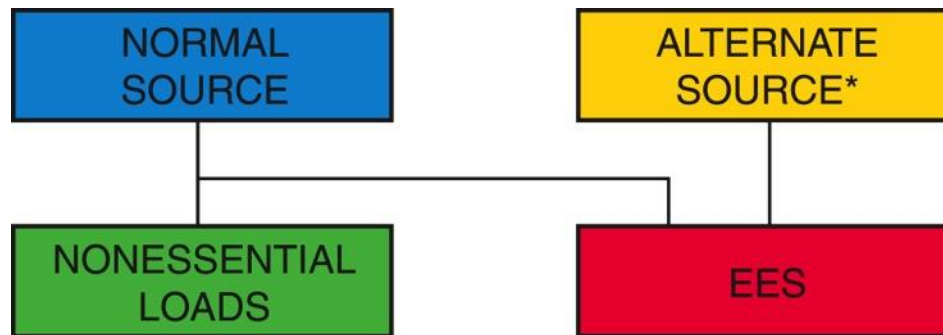
1. List the types of electrical distribution systems used in the medical industry.
2. Describe the categories and branch portions of the distribution circuits.
3. List the items allowed in the life safety branch and critical branch.
4. Describe ground fault protection required to ensure a safe environment.
5. List the required wiring methods in a health care facility.
6. Explain the application of special wiring devices in critical care locations.
7. Describe the requirements for the installation of specialty equipment.
8. Describe the applications of isolated power systems.

This is a knowledge-based module; there are no Performance Tasks.



Introduction; Essential Electrical System Types

- There are four patient care spaces: basic care, general care, critical care, and support. Each has specific *NEC*[®] requirements.
- Power is divided into two categories: nonessential loads and the essential electrical system (EES). The EES is divided into the equipment branch, life safety branch, and critical branch.

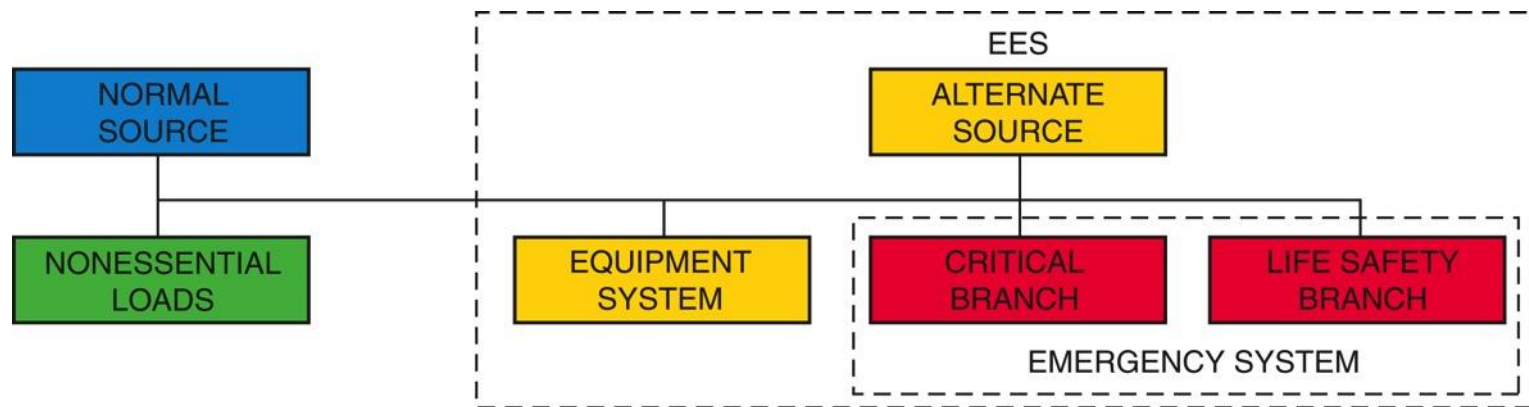


*ALTERNATE SOURCE IS PART OF THE EES.



EES Branches

- The equipment branch supplies power to facility operations, such as the telephone system.
- The life safety branch supplies power to those items needed to ensure the safety of building occupants as well as patients.
- The critical branch supplies power to areas directly related to patient care.

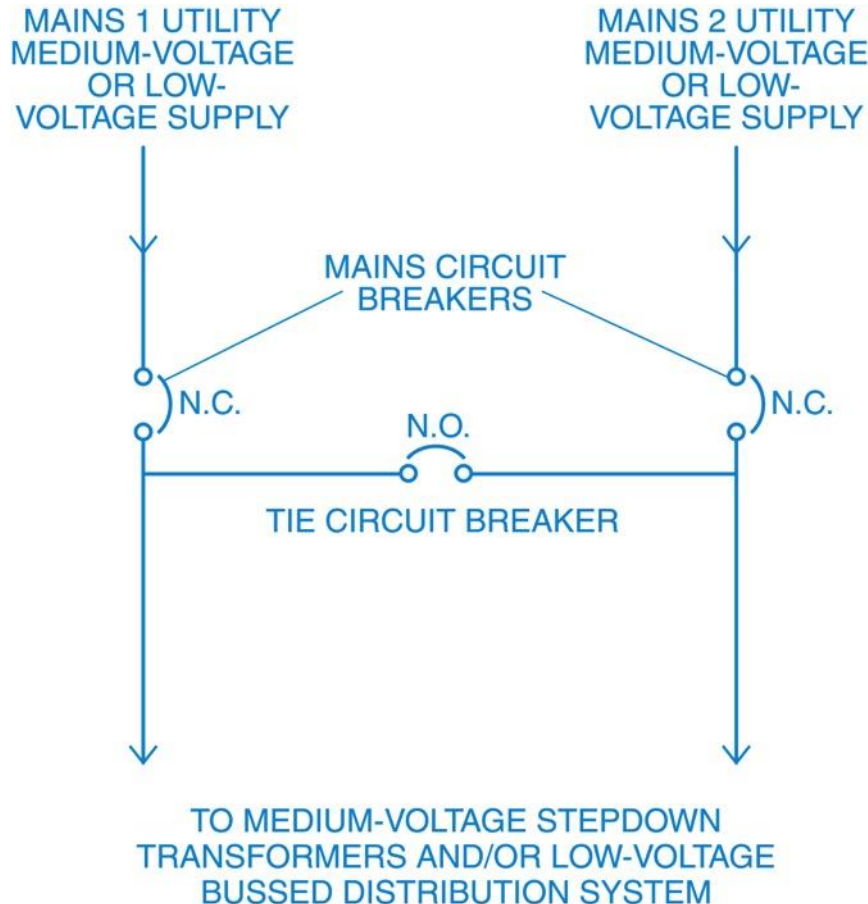


26402-14_F02.EPS



3.0.0 – 3.4.0

Electrical Distribution Systems



26402-14_F03.EPS

- Power to a health care facility is usually supplied by more than one distribution point. Each feeder is designed to carry the full system load.
- A double-ended substation is used with systems over 750kV. A tie circuit breaker reroutes power upon loss of one of the incoming feeders.

3.0.0 – 3.4.0

Typical Diesel Engine Generator

- One or more diesel engine generators are normally used to provide backup power for a Type 1 or 2 EES.
- Generators housed outdoors or in an unheated environment must have battery heaters and cold-weather starting equipment in order to meet the 10-second startup requirement.



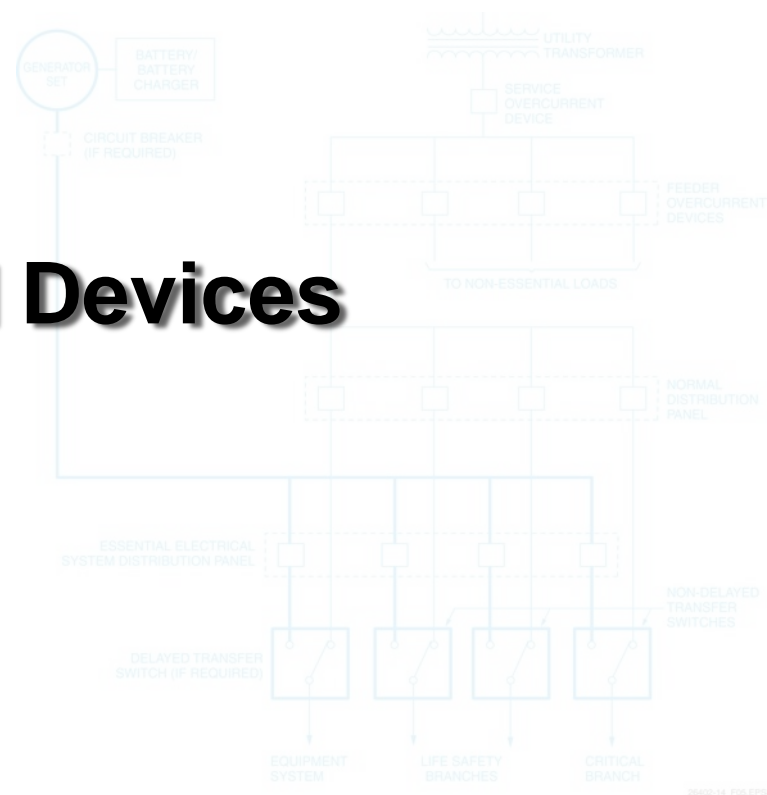
26402-14_F04.EPS

3.0.0 – 3.4.0

Next Session... Diagram of an Alternate Power Source with Transfer Switching for an EES

- One or more diesel engine generators are normally used to provide backup power for a Type 1 or 2 EES.
- Generators housed outdoors or in an unheated environment must have battery heaters and cold-weather starting equipment in order to meet the 10-second startup requirement.

Wiring and Devices



4.0.0 – 4.7.7

Wiring and Devices

Devices on emergency power must be color-coded using a distinctive color such as red, or by labeling. Color coding is easier, less expensive, and avoids later confusion if labels are painted over or removed.

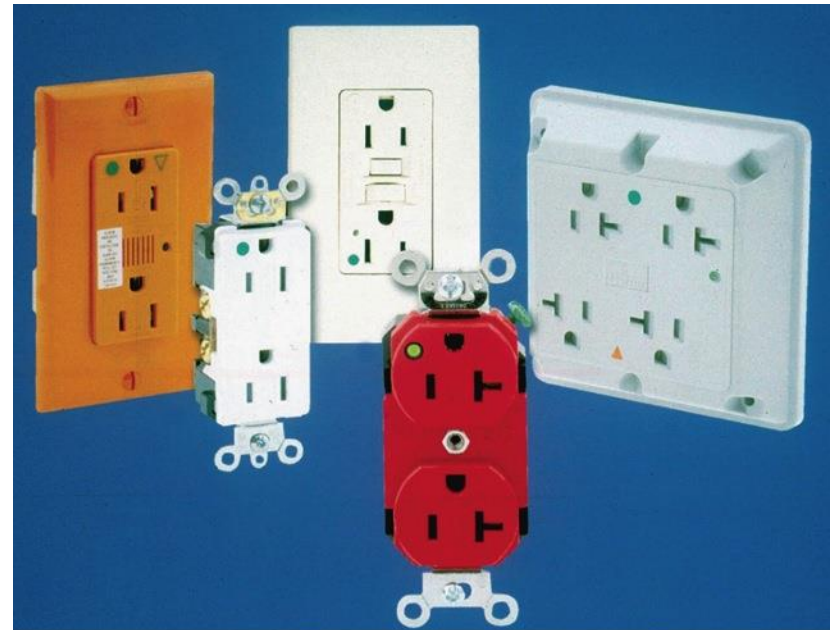


26402-14_F06.EPS

4.0.0 – 4.7.7

Hospital-Grade Receptacles

- Receptacles in health care facilities should be mounted at a height accessible to patients in wheelchairs (approximately 24" off the floor).
- All receptacles must be hospital-grade devices and tamper-resistant where required.



26402-14_F07.EPS

4.0.0 – 4.7.7

Patient Bed Location Receptacles

- Per **NEC Section 517.18**, every patient bed location in a general care space must be supplied with at least two branch circuits, one from the normal system and the other from the emergency system.
- Each patient bed location must also be supplied with a minimum of four receptacles.



(A) RECEPTACLES ABOVE BED



(B) RECEPTACLES BEHIND BED

26402-14_F08.EPS

4.0.0 – 4.7.7

Next Session... Receptacle Configuration in a Critical Care Area



Communication, Signaling, Data, and Fire Alarm Systems

- Per *NEC Section 517.19*, every patient bed location in a critical care area must be supplied with at least two branch circuits, one from the normal system and the other from the emergency system.
- Each patient bed location must also be supplied with a minimum of six receptacles.

5.0.0

Communication, Signaling, Data, and Fire Alarm Systems



26402-14_F10.EPS

- Communication, signaling, data, and fire alarm systems in patient care spaces must conform to the same insulation and isolation requirements as electrical distribution systems.
- Devices used to communicate between patient care spaces and other areas must use a transmission system that prevents grounding interconnection of the appliances.

6.0.0 – 6.2.0

Next Session...



26402-14_F11.EPS

Isolated Power Systems

- Isolated power systems are used to prevent power interruption due to a single line-to-ground fault and to isolate power from any electrical ground in critical areas.

Wrap Up

- Isolated power systems must be provided with an approved, continually functioning line isolation monitor that indicates possible leakage or fault current.

Wrap Up

3-2-1

- 3 – Write 3 important things learned during class
- 2 – Write 2 questions you have about the material
- 1 – Write 1 thought you had about the material



Next Session...

MODULE EXAM

Review the complete module to prepare for the module exam. Complete the Module Review as a study aid.

