

## Lesson 6: *Electrical Symbols in Wiring Plans*

### **Lesson 6: *Electrical Symbols in Wiring Plans***

The use of symbols in wiring plans is a standardized method of identifying the location of electrical components. Familiarity with these symbols is necessary to read plans and correctly install electrical systems.

#### **Lighting, Receptacle, and Switch Outlets**

The symbols in Figure 6.1 are those most commonly used to identify electrical lighting outlets. In describing light fixtures, the symbols identify those fixtures that are surface mounted into or onto the wall or ceiling and those that hang from hardware in the ceiling. Blanked outlets are outlets with cover plates placed over the boxes. They have wires in the box which may be used for future lighting or power needs. Junction boxes are those electrical boxes in which circuit wires are routed to different locations in the structure.

Symbols are also used to indicate the different types of receptacle outlets commonly included in agricultural structures. These symbols are shown in Figure 6.1. Receptacle outlets include standard outlets with one, two (duplex), or three (triplex) outlets per box and specialized receptacle outlets. Letters next to the symbol for specialized outlets indicate their purpose; for example, DW would stand for dishwasher. Some specialized outlets, such as special purpose outlets that have modified plug

openings for specific applications, are diagramed for 110-volt systems. Range outlets describe 220-volt receptacles. Clock hanger receptacles are specialized low amperage outlets designed to be used with electric clocks.

Special symbols are used to represent switch outlets as well. Switch symbols note the number of poles, or terminal connection points on the switch, and if the switch connections are for three- or four-way light systems with multiple switches. Other specialized switches identified are those with a lamp on the switch, switches with outlet receptacles included at the location, automatic door switches, switches that have built-in timers to turn them on or off, and ceiling pull switches. Figure 6.2 shows the symbols for these switches.

#### **Power, Fusing, and Grounding**

Symbols are also used to identify electrical power sources, circuit overload protection devices, and grounding sites of the agricultural structure, as shown in Figure 6.2. Those power sources typically identified for agricultural purposes are electric motors installed in the system, electric generators, and power transformers for power conversion, as in 3-phase electric power systems. The locations of watt-hour meters, grounding sites, and circuit breakers and fuses in branch circuits are all indicated by special symbols.

### Panelboards, Switchboards, and Related Equipment

Symbols related to the power and fusing systems identify panelboards at the service entrance and switchboards and switch controllers for electrical motor operations. These symbols are illustrated in Figure 6.3.

### Remote Control Stations for Motors or Other Equipment

Other symbols related to the operation of motors are shown in Figure 6.3. Push-button stations are electric switches that use a button-type on/off switch to control electric motors. Remote control stations are those locations where electric motor switches are in a location that is not directly attached to the motor that the switch operates. Float, limit, and pneumatic switches are all specialized variations of remote switches. Thermostat switches are switches used to control electric motors or other electric devices; they are activated by changes in air temperature.

### Miscellaneous Connections

Because of the environmental conditions present in most agricultural structures, specialized electrical equipment is installed. This

equipment is identified using a special group of electrical symbols. Figure 6.3 shows these symbols. For example, some of the symbols identify electrical fixtures that are designed to provide protection from weather, water, dust, flammable vapors, and explosions caused by combustible materials. They also indicate grounded (GFCI) and recessed devices.

### Summary

In order to successfully wire a building, being able to read electrical wiring diagrams is a must.


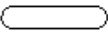

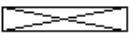


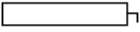


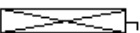







The symbols shown in this lesson are those commonly used in agricultural structures. Familiarity with these symbols will help in correctly installing electrical wiring.

### Credits

Cooper, Elmer L. *Agriculture Mechanics: Fundamentals and Applications*. 2nd ed. Albany: Delmar, 1996.

Holzman, H.N. *Modern Residential Wiring*. South Holland, Ill.: Goodheart-Willcox Company, Inc., 1986.

Phipps, Lloyd J., and Carl L. Reynolds. *Mechanics in Agriculture*. 4th ed. Danville: Interstate Publishers, Inc., 1990.

Panelboards, Switchboards, and Related Equipment	Remote Control Stations for Motors or Other Equipment	Connections
 Surface-Mounted Panelboard and Cabinet	 Push-Button Station	 Weatherproof
 Motor or Other Power Controller	 Float Switch - Mechanical	 Watertight
 Externally Operated Disconnection Switch	 Limit Switch - Mechanical	 Dust Tight
 Combination Controller and Disconnection Means	 Pneumatic Switch - Mechanical	 Grounded
	 Thermostat	 Vapor Tight
		 Rain Tight
		 Explosion Proof
		 Recessed