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**SERVICE DROP AND
SERVICE ENTRANCE —
GETTING ELECTRICITY INTO THE HOUSE**

Electrical

M O D U L E

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► 1.0 OBJECTIVES

1.1 Objectives

1.1.1 OBJECTIVE OF THE ELECTRICAL MODULE

The goal of this Module is to ensure an understanding of the basics of residential electrical systems. You should be able to identify and describe common electrical components, understand the function and importance of each, and be able to recognize adverse conditions that may occur. We will examine the causes and implications of these conditions and appropriate courses of action to be recommended to clients. The systems addressed include –

1. service drop and entrance
2. the grounding system
3. the electrical service box, including the main disconnect and fuses or breakers
4. distribution panels
5. branch circuit wiring
6. lights, outlets, switches, and junction boxes

*This Is Not
The Last Word*

This program is not an in-depth electrical course and you should not assume that you are an electrician after having studied this material. If, at the end of this Module, you are not comfortable with electrical systems, we urge you to take additional courses to enhance your knowledge and to protect yourself.

1.1.2 OBJECTIVE OF SECTION 1: SERVICE DROP AND SERVICE ENTRANCE

During this section we will –

- review the basics of residential electrical systems
- discuss the service drop, service entrance and service size

You will learn –

- how to recognize the service drop and service entrance
- how to determine the size of the service
- how the service drop and service entrance should be arranged
- what common problems are found
- what these problems mean
- how to look for these problems
- what to advise clients to do

Electrical

M O D U L E

STUDY SESSION 1

1. The first Study Session outlines the Scope of the electrical inspection as set out in the ASHI® Standards of Practice.

Note: ASHI® stands for American Society of Home Inspectors.

This Session also includes a general introduction to electrical inspection, including an overview of the inspection process.

2. At the end of this Study Session, you should understand –
 - what is included in an electrical inspection according to our professional standards
 - why electrical inspections are challenging
 - some of the safety issues to be considered with electrical inspections
 - the evolution of residential wiring through the twentieth century
3. This is a relatively short Study Session. You will probably finish it in about half an hour.
4. Quick Quiz 1 is included at the end. Answers can be written in your book.

Key Words:

- ***Dangerous***
- ***Safety***
- ***Service drop***
- ***Service entrance conductors***
- ***Service lateral***
- ***Amperage and voltage ratings***
- ***Complex***

► 2.0 SCOPE AND INTRODUCTION

2.1 SCOPE

THE ASHI® STANDARDS OF PRACTICE

These are the following components of the ASHI® Standards of Practice, effective, January 1, 2000 :

- Purpose and Scope
- Electrical Section
- General Exclusions and Limitations
- Glossary of Italicized Terms

2. PURPOSE AND SCOPE

2.1 The purpose of these Standards of Practice is to establish a minimum and uniform standard for private, fee-paid home inspectors who are members of the American Society of Home Inspectors. Home Inspections performed to these Standards of Practice are intended to provide the client with information regarding the condition of the systems and components of the home as inspected at the time of the Home Inspection.

2.2 The Inspector shall:

A. *inspect:*

1. *readily accessible systems and components* of homes listed in these Standards of Practice.
2. *installed systems and components* of homes listed in these Standards of Practice.

B. *report:*

1. on those *systems and components* inspected which, in the professional opinion of the *inspector*, are *significantly deficient* or are near the end of their service lives.
2. a reason why, if not self-evident, the *system or component* is *significantly deficient* or near the end of its service life.
3. the inspector's recommendations to correct or monitor the reported deficiency.
4. on any *systems and components* designated for inspection in these Standards of Practice which were present at the time of the *Home Inspection* but were not inspected and a reason they were not inspected.

2.3 These Standards of Practice are not intended to limit inspectors from:

- A. including other inspection services, systems or components in addition to those required by these Standards of Practice.
- B. specifying repairs, provided the *inspector* is appropriately qualified and willing to do so.
- C. excluding *systems and components* from the inspection if requested by the client.

7. ELECTRICAL SYSTEM

7.1 The *inspector* shall:

A. *inspect*:

1. the service drop.
2. the service entrance conductors, cables, and raceways.
3. the service equipment and main disconnects.
4. the service grounding.
5. the interior components of service panels and sub panels.
6. the conductors.
7. the overcurrent protection devices.
8. a *representative number* of installed lighting fixtures, switches and receptacles.
9. the ground fault circuit interrupters.

B. *describe*:

1. the amperage and voltage rating of the service.
2. the location of main disconnect(s) and sub panels.
3. the *wiring methods*.

C. *report*:

1. on the presence of solid conductor aluminum branch circuit wiring.
2. on the absence of smoke detectors.

7.2 The *inspector* is NOT required to:

A. *inspect*:

1. the remote control devices unless the device is the only control device.
2. the alarm *systems* and *components*.
3. the low voltage wiring, *systems* and *components*.
4. the ancillary wiring, *systems* and *components* not a part of the primary electrical power distribution *system*.

B. measure amperage, voltage, or impedance.

13. GENERAL LIMITATIONS AND EXCLUSIONS

13.1 General limitations:

A. Inspections performed in accordance with these Standards of Practice

1. are not *technically exhaustive*.
 2. will not identify concealed conditions or latent defects.
- B. These Standards of Practice are applicable to buildings with four or fewer dwelling units and their garages or carports.

13.2 General exclusions:

A. The *inspector* is not required to perform any action or make any determination unless specifically stated in these Standards of Practice, except as may be required by lawful authority.

B. *Inspectors* are NOT required to determine:

1. the condition of *systems* or *components* which are not *readily accessible*.
2. the remaining life of any *system* or *component*.
3. the strength, adequacy, effectiveness, or efficiency of any *system* or *component*.
4. the causes of any condition or deficiency.
5. the methods, materials, or costs of corrections.
6. future conditions including, but not limited to, failure of *systems* and *components*.
7. the suitability of the property for any specialized use.
8. compliance with regulatory requirements (codes, regulations, laws, ordinances, etc.).
9. the market value of the property or its marketability.
10. the advisability of the purchase of the property.
11. the presence of potentially hazardous plants or animals including, but not limited to wood destroying organisms or diseases harmful to humans.
12. the presence of any environmental hazards including, but not limited to toxins, carcinogens, noise, and contaminants in soil, water and air.
13. the effectiveness of any *system* installed or methods utilized to control or remove suspected hazardous substances.
14. the operating costs of *systems* or *components*.
15. the acoustical properties of any *system* or *component*.

C. *Inspectors* are NOT required to offer:

1. or perform any act or service contrary to law.
2. or perform *engineering* services.
3. or perform work in any trade or any professional service other than *home* inspection.
4. warranties or guarantees of any kind.

D. *Inspectors* are NOT required to operate:

1. any *system* or *component* which is *shut down* or otherwise inoperable.
2. any *system* or *component* which does not respond to *normal operating controls*.
3. shut-off valves.

E. *Inspectors* are NOT required to enter:

1. any area which will, in the opinion of the *inspector*, likely be dangerous to the *inspector* or other persons or damage the property or its *systems* or *components*.
2. The *under-floor crawl spaces* or attics which are not *readily accessible*.

F. *Inspectors* are NOT required to *inspect*:

1. underground items including, but not limited to underground storage tanks or other underground indications of their presence, whether abandoned or active.
2. *systems* or *components* which are not installed.
3. *decorative* items
4. *systems* or *components* located in areas that are not entered in accordance with these Standards of Practice.
5. detached structures other than garages and carports.
6. common elements or common areas in multi-unit housing, such as condominium properties or cooperative housing.

G. *Inspectors* are NOT required to:

1. perform any procedure or operation which will, in the opinion of the *inspector*, likely be dangerous to the *inspector* or other persons or damage the property or its *systems* or *components*.
2. move suspended ceiling tiles, personal property, furniture, equipment, plants, soil, snow, ice, or debris.
3. *dismantle* any *system* or *component*, except as explicitly required by these Standards of Practice.

GLOSSARY OF ITALICIZED TERMS

Alarm Systems

Warning devices, *installed* or free-standing, including but not limited to; carbon monoxide detectors, flue gas and other spillage detectors, security equipment, ejector pumps and smoke alarms

Automatic Safety Controls

Devices designed and installed to protect *systems* and *components* from unsafe conditions

Component

A part of a system

Describe

To *report* a *system* or *component* by its type or other observed, significant characteristics to distinguish it from other *systems* or *components*

Dismantle

To take apart or remove any component, device or piece of equipment that would not be taken apart or removed by a homeowner in the course of normal and routine home owner maintenance

Further Evaluation

Examination and analysis by a qualified professional, tradesman or service technician beyond that provided by the *home inspection*

Home Inspection

The process by which an *inspector* visually examines the *readily accessible systems* and *components* of a home and which *describes* those *systems* and *components* in accordance with these Standards of Practice

Household Appliances

Kitchen, laundry, and similar appliances, whether *installed* or free-standing

Inspect

To examine *readily accessible systems* and *components* of a building in accordance with these Standards of Practice, using *normal operating controls* and opening *readily openable access panels*

Inspector

A person hired to examine any *system* or *component* of a building in accordance with these Standards of Practice

Installed

Attached such that removal requires tools

Normal Operating Controls

Devices such as thermostats, switches or valves intended to be operated by the homeowner

Readily Accessible

Available for visual inspection without requiring moving of personal property, *dismantling*, destructive measures, or any action which will likely involve risk to persons or property

Readily Openable Access Panel

A panel provided for homeowner inspection and maintenance that is within normal reach, can be removed by one person, and is not sealed in place

Recreational Facilities

Spas, saunas, steam baths, swimming pools, exercise, entertainment, athletic, playground or other similar equipment and associated accessories

Report

To communicate in writing

Representative Number

One component per room for multiple similar interior *components* such as windows and electric outlets; one *component* on each side of the building for multiple similar exterior *components*

Significantly Deficient

Unsafe or not functioning

Shut Down

A state in which a *system* or *component* cannot be operated by *normal operating controls*

System

A combination of interacting or interdependent components, assembled to carry out one or more functions

Technically Exhaustive

An investigation that involves dismantling, the extensive use of advanced techniques, measurements, instruments, testing, calculations, or other means

Unsafe

A condition in a *readily accessible, installed system or component* which is judged to be a significant risk of personal injury during normal, day-to-day use. The risk may be due to damage, deterioration, improper installation or a change in accepted residential construction standards

Wiring Methods

Identification of electrical conductors or wires by their general type, such as “non-metallic sheathed cable” (“Romex”), “armored cable” (“bx”) or “knob and tube”, etc.

► NOTES ON THE STANDARDS

<i>Inspect</i>	The Standards are clear on the meaning of inspect. When we inspect we have to look at and test the components listed in the Standards. We look at them if they are readily accessible or if we can get at them through readily openable access panels. These are panels designed for the homeowner to remove. They are within normal reach, can be removed by one person, and are not sealed in place.
<i>Testing</i>	We test components and systems by using their normal operating controls, but not the safety controls. We turn thermostats up or down, open and close doors and windows, turn light switches and water faucets on and off, flush toilets, etc. We do not test heating systems on high limit switches, test pressure relief valves on water heaters and boilers, overload electrical circuits to trip breakers, etc.
<i>Systems Shut Down</i>	We do not start up systems that are shut down. If the furnace pilot is off, we don't light it. If the electricity, water or gas is shut off in the home, we don't turn it on. If the disconnect for the air conditioner is off, we don't turn it on.
<i>Accessible</i>	We have to inspect house components that are readily accessible. That means we don't have to move furniture, lift carpets or ceiling tiles, dismantle components, damage things or do something dangerous. The exception is covers that would normally be removed by homeowners during routine maintenance. The furnace fan cover is a good example because homeowners remove this to change the furnace filter. Many inspectors use tools as the threshold. If tools are required to open or dismantle the component, it is not considered readily accessible.
<i>Installed</i>	We only have to inspect things that are installed in homes. This means we don't have to inspect window air conditioners or portable heaters, for example.