

# **Top 10 Electrical Mistakes and How to Avoid Them**

**Volume 1**

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# Introduction

**Avoiding these mistakes will help ensure project success. Ignoring them can lead to problems for you and your home.**

Every day thousands of Do-It-Yourselfer's, Handy Men and Women perform tasks to improve their home, most of the time saving themselves money and adding value to their home. Usually these projects go smoothly, but sometimes assistance is needed.

Opinions and information of all types from people with a variety of qualifications abound on-line and at the local level. Being a working licensed electrical contractor as well as operating Ask-The-Electrician.com with assistance from a small staff, I am in a unique position to receive an enormous amount of real-time information about what is happening when it comes to electrical applications and devices around the home. Code changes, energy efficient devices, safety requirements, and new tools and parts keep this industry constantly on the move. Filtering this information down to the public and contractor level becomes a communication challenge especially when people of various degrees of qualification become involved. Often times, wrong advice or a lack of understanding can turn a project into a nightmare.

Through Ask-The-Electrician.com, it is my sincere desire to help translate vital information into a useable and easy to understand format to help you decide whether to do your home project yourself or hire a qualified contractor to perform the work for you.

Found in this report are just a few of the most common electrical mistakes I see people make. Rather than photographing paid models to perform staged tasks, the following photos are from actual job sites. We are not sponsored or underwritten by any special interest groups or companies. As of this writing, our web site services are free, with the understanding that the user of this information accepts full responsibility for their actions and interpretations of the material found on Ask-The-Electrician.com. We are in no way held responsible for anything resulting from what you decide to do based upon the information found on the web site or any of its publications.

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**Learn More about Home Electrical Wiring**

**[Home Electrical Wiring Book](#)**

**[Basics of Home Electrical Wiring – Video Tutorial Course](#)**

# Preface

## Dedication and Memoriam

This book – which happens to be about Safety – is dedicated to my Father. My Dad taught me everything he knew about electricity, especially the importance of Respecting Electricity. By understanding the potential of electricity and respecting its incredible power, when working with and around it you will reduce the risk of being harmed by it.

Thanks Dad, for everything, and all the jobs we did together - You were Great!

Electricity is a wonderful thing, given to us from our mysterious creator; in fact, I personally believe electricity is an extension of the awesome power of God. Man has learned to use and serve one another in countless ways through electricity; however I personally feel that we haven't even begun to fully realize its awesome potential. The great Nicola Tesla was the only one who really started to discover the full potential of the many things electricity could be used for. Unfortunately his work was throttled by man's lust for power and the greed for money. Perhaps Tesla's work will continue, thanks to the power of the Internet and the great minds that are at work learning more and more about this great force entrusted to mankind. May we use it wisely.

## **CAUTION**

Always positively identify any circuit you plan to work on. Turn off the circuit at the panel, fuse box or power source, then attach a notice to advise others before performing any electrical work.

# Forward

Lets begin with the **Biggest Problem**  
that leads to a whole host of other problems:



Planning your project with a proper knowledge of all the components involved will prove to be the major contribution to your project success. What is shown in this picture is the

cavity where a refrigerator is to be installed. The cabinet dimensions were never compared to the actual receptacle layout on the existing wall. The cabinets were delivered and the installer performed his duty of installing the cabinets, and ended up covering more than 50% of two receptacles in the wall. The end result was having to rewire the entire wall according to the cabinet layout, which was adopted to the job from that date forward.

## **Mistake #1: Project Without a Permit**

### **Electrical Code:**

All electrical projects need to be wired according to Codes which are based upon Safety Standards. When working with a permit you are guaranteed that the work will be inspected and passed when the project is approved. Your local building department and inspector are great sources for information.



### **Well Water Pump System**

#### **Problem:**

The first problem is that a person unfamiliar with the codes required for this installation performed this project without a permit. By obtaining a permit and working with the inspector, the installer would have used the approved methods and materials.

This system was wired with indoor romex wire, was unprotected, and was without a protective connector at the pressure switch.



#### **Solution:**

Obtain a permit and install THW or THHN wiring inside a protective conduit and enter the pressure control switch using the appropriate conduit connectors. Have the project inspected and have full confidence that the system will never fail because you did it right.

## Mistake #2: Grounding Methods

### Electrical Code:

The electrical system must maintain a continuous bonded ground throughout all of the installed wiring components and devices.



### Double Duplex Receptacles

#### Problems:

Un-bonded ground wires prevent the ground path from being transferred to the second ground wire. The ground path essentially stops and does not continue even though there is a ground wire present.

Also: These 20 amp receptacles are installed on a 15 amp circuit.



#### Solution:

Bonding the ground wires as shown in this 2 gang box will cause the ground to travel through to the rest of this circuit.

Change the 20 amp receptacles to 15 amp receptacles

### **Mistake #3: Box Sizing**

#### **Electrical Code:**

Electrical boxes are measured in cubic inches of space available. This is transposed into how many of the 14, 12, or 10 gage wires are allowed in the box.



#### **Single Gang Receptacle Box**

##### **Problem:**

Overloaded device box creates extreme box-fill. Also: Side wiring of more than one wire per screw terminal presents an unsafe wiring condition.



##### **Solution:**

Installing the right size electrical box for the number of conductors to be installed. Tail each set of wires creating a Series Wiring Method, which will not cause the circuit load to travel through the receptacle.

## Mistake #4: Mixed Wire Gages

### Electrical Code:

Match the same size wire gage throughout the circuit to maintain protection for the wire and prevent an overloaded condition.



### Multi-Gang Switch Box

#### Problems:

Mixed wire of 12 and 14 gages were installed and shared with this lighting circuit and the switches. This compromised the circuit integrity and could have resulted in a circuit overload condition.

Also: Switch frame ground screws, which are not bonded to the ground wires.



#### Solution:

Install the same size wire gage for the lighting circuit and switches ensuring circuit integrity.

You will notice that the Yellow #12 Romex is installed in this 3-gang box. This box is installed in a bathroom and will provide for the required GFCI Receptacle, which will be placed next to the lighting switches.

## **Mistake #5: Open Splice**

### **Electrical Code:**

Electrical Splices are to be made inside an approved junction box with a blank cover on the box.



### **Open Splice Found in Attic**

#### **Problem:**

Open splice without a junction box and cover. Also: It was noted that this splice led to a wall-mounted fixture in a closet, which had a close proximity to the ceiling and the closet shelf.



#### **Solution:**

Install a junction box in an accessible area where the spliced wires will be installed using approved wire connectors and bonding the ground conductors, then place a blank cover on it.

The fixture in the closet was changed out to be a compliant fluorescent light.

## **Mistake #6: Cable Support**

### **Electrical Code:**

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A cord clamp is to be used where the cord enters a junction box.



## Dishwasher Main Power Junction box

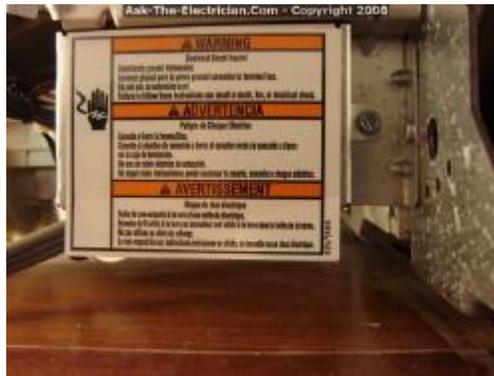
### Problem:

The cord does not enter the junction box through the provided knock out, but is attached to the main dishwasher wires by entering the junction box directly through the junction box cover opening. This prevents the cover from being fastened in place.

Also: The ground wire from the cord was cut off preventing the dishwasher from being properly bonded to ground.

### Solution:

Bring the cord through the half inch knock out opening using a 2 screw cord connector, attach the ground wire to the supplied ground screw and secure the cover in place.



## Mistake #7: Receptacle Polarity

### Electrical Code:

Correct polarity must be maintained where the wiring attaches to any electrical device.



### 15 Amp - 120 Volt Receptacle

#### Problem:

The Black Wire (hot) is attached to the Silver Neutral terminal screw and the White Neutral wire is attached to the Brass (hot) terminal screws.

This is a reverse polarity-wiring scenario.



#### Solution:

Reverse this wiring by attaching the Black wire to the Brass screw terminal and the White wire to the Silver or Neutral screw terminal

## Mistake #8: Wrong Materials

### Electrical Code:

Use only approved materials when installing electrical circuits, providing protection and reliability for the electrical device it is serving.



### Underground Conduit Providing Outdoor Power

#### Problem:

Schedule 20 PVC Pipe was used in place of Schedule 40

Also: A plumbing PVC 90 Degree connector was installed on an electrical conduit.



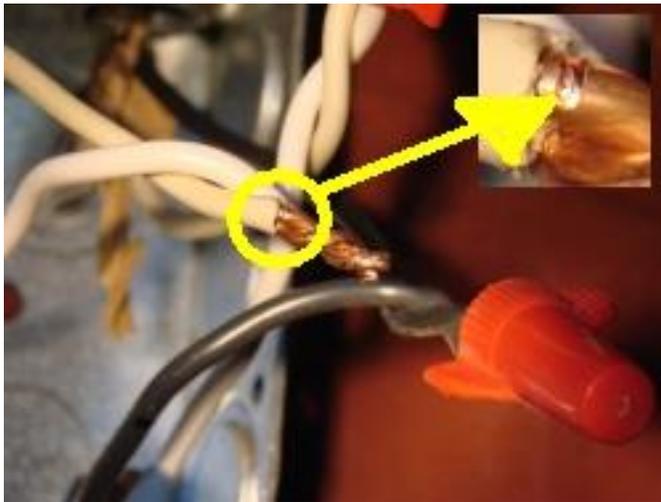
#### Solution:

Install a Schedule 40 PVC Conduit and use a weatherproof junction box to splice the wiring and bond the ground wire.

## Mistake #9: Wrong Tools

### Electrical Code:

Use tools in a manner that does not harm or damage the wiring components of an electrical circuit. Carefully select good quality tools for performing your projects.



### Wire Stripped to Wrong Gage

#### Problem:

Wrong use of a wire stripping tool or a non-stripping tool was used. This scored the copper portion of the wire, which caused the wire to break when making the splice.

**Solution:** Use the correct wire-stripping tool, being careful to strip the wire gage in the correct gage slot. Always use good quality insulated electrical tools.



## Mistake #10: Skill Level

### Electrical Code:

Make certain that you are qualified to perform any do-it-yourself project. Just because you can make something work does not mean that the task was done correctly and to code.



### Illegal Extension of a Circuit

#### Problem:

The receptacle was removed to allow interior romex to be installed on the exterior of this home, serving a roof mounted evaporative cooler.

Also: A control switch was installed into the low receptacle behind this exterior box, which contained a switch to control the unit.



#### Solution:

All of the surface romex was removed. The outside GFCI protected receptacle was installed and the inside control switch was removed and an outlet was installed.