

Outdoor Lighting

Installing Outdoor Wiring/Lighting

Take some time to read the following tips and instructions on how to install outdoor wiring. These instructions can help you save time and effort, while ensuring a safe and satisfying installation. In this document you will find information about:

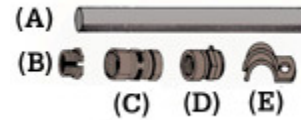
- [Basic Rules for Outdoor Lighting Installations](#)
- [Weatherproof Switches and Outlets](#)
- [Underground Installation From the House](#)
- [Attaching Lighting Fixtures and Outlets to Buried Cable](#)
- [Installing Post Lantern Yard Lights](#)
- [Proper Grounding of Outdoor Fixtures](#)
- [Installing Timer Switches in Outdoor Lighting](#)

TOOL AND MATERIAL CHECKLIST	
Conduit	Conduit Adapters
Tiling Spade	Weatherproof Elbows
Side-Cutter Pliers	Timer Switch
Hacksaw	Stakes
Electrical Tape	Ground Fault Interrupter
Temporary Guy Wire	Conduit Bender
Conduit Couplings and Connectors	Weatherproof Receptacles
Hacksaw Blades	Underground Feed Cable (UF Cable)
Hammer	Screwdriver

Step 1

BASIC RULES FOR OUTDOOR LIGHTING INSTALLATIONS

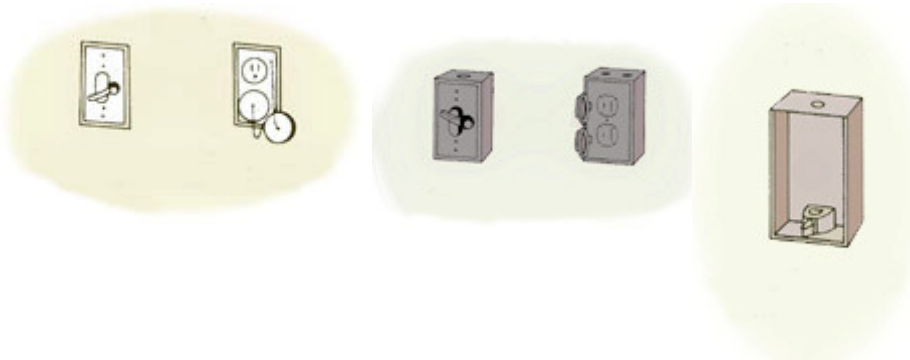
- Your first step should be to check local codes regarding outdoor lighting. Be sure to follow these code requirements carefully.
- Always use type UF cable for installations requiring underground wiring. The UF implies that there must be a fuse or breaker inside the house at the starting point of the underground wiring installation.
- For your outdoor lighting project, use only those materials that have an Underwriter's Laboratory (UL) approval.
- Cable used for underground installations must contain a grounding conductor. Outdoor fixtures must be grounded for complete safety.
- Use conduit to protect the cable where it is exposed above ground and where bends are made below ground (see image).
- Some local codes may require you to cover the entire cable with conduit.
- Many local codes now require outdoor circuits to be protected with GFIs, Ground Fault Interrupters. There are two basic types of GFIs. One is designed to be installed in a circuit breaker box. The other is designed to fit into outlet boxes. Check your local code.
- Always bury any underground cable at least 18" deep, but 24" is preferable. Cables buried at least 24" deep are less likely to be bothered by spading forks and other tools commonly used around the yard.
- For any outside wiring installation, always use weatherproof equipment, such as boxes, receptacles, etc.
- Remember to shut off the electrical current at the main switch before starting any underground wiring tie-in.



Step 2

WEATHERPROOF SWITCHES AND OUTLETS

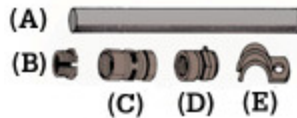
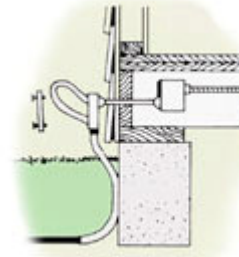
- Weatherproof switches and outlet boxes are available in both flush-mount or surface-mount styles.
- The first image below shows a flush-mounted switch and a flush-mounted receptacle. These must always be installed in a weatherproof metal switch or outlet box.
- The second image below shows a surface-mounted switch and outlet. These are contained in their own weatherproof boxes and can be mounted directly to any flat surface.
- The third image below shows a weatherproof box. These boxes can be mounted on posts or conduit when you're installing any switch or receptacle, other than the surface-mounted type.
- The flush-mounted and surface-mounted switches and receptacles are designed to be completely weather resistant when they are installed correctly.



Step 3

UNDERGROUND INSTALLATION FROM THE HOUSE

- Before you begin, shut off the electrical current at the main switch box.
- For an underground wiring installation, mount a breaker or a fuse box in a location similar to that illustrated in this image. The breaker box should start the installation no matter what type of cable you are using.
- Run conduit from the breaker box through the wall to where the weatherproof elbow will be mounted on the outside wall (see image).
- Continue the conduit down from the weatherproof elbow to where it bends, 18" to 24" below ground. Remember, conduit is generally



- required where the cable bends underground (see image).
- Mount the conduit to the building foundation with conduit connectors (see image, part D).
- This image shows the components for wiring with conduits. (part A) shows the conduit itself. (part B) illustrates an adapter for attaching thin-walled conduit to rigid conduit. (part C) is a coupling for connecting two pieces of conduit. (part D) shows the connector used for attaching a piece of conduit to a weatherproof box. (part E) is the pipe strap you should use to fasten the conduit to the wall about every 6' on exposed runs and about every 10' on concealed runs.
- Your local code may require that the entire underground cable be covered with conduit. The main purpose of the conduit is to protect the cable from spading tools used in the yard.
- This image shows a conduit bender and the proper method for inserting and bending thin-walled conduit. With care and practice, you will learn to bend conduit easily.
- Insert the cable through the weatherproof elbow, and then down through the conduit to the 18" to 24" level where it is to be buried. Pull the cable tightly through the weatherproof elbow and reattach the cover.



Step 4

ATTACHING LIGHTING FIXTURES and OUTLETS TO BURIED CABLE

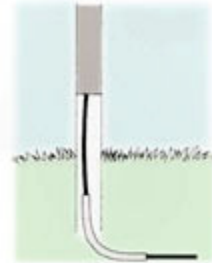
- This image illustrates various lighting fixtures and outlet boxes that you can connect to the buried cable at any point. It's important to plan your yard lighting carefully before starting the job.
- Plan ahead to determine where to install weatherproof outlet boxes (see image). These outlet boxes are especially handy around patios and recreational areas of your yard. They provide readily accessible receptacles for appliances, record players, radios, Christmas lights, etc.
- Weatherproof outlet boxes also provide handy outlets for spike lights, electric lawn mowers, electric trimmers, etc.
- Install protective conduit above ground where any weatherproof outlet box or elbow is installed.



Step 5

INSTALLING POST LANTERN YARD LIGHTS

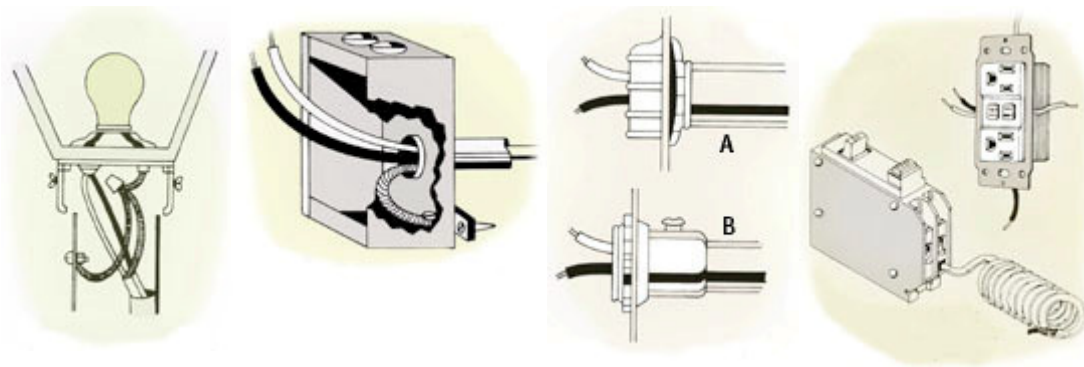
- Dig a hole about 2' deep with an ordinary post hole digger or tiling spade. Run cable up through the lamppost, then fill the hole with about 12" of concrete mix. Insert the lamppost into the concrete mix in an upright, plumb position. Use a long level or plumb bob to make sure the lamp is exactly straight. Remember, you cannot straighten it after the concrete hardens.
- Use a bent piece of conduit to protect the turn in the cable below the post (see image). This eliminates the danger of trouble at the turn.
- You may want to use temporary stakes and guy wires to hold the post lantern in an upright position until the concrete dries. Using four guy wires in opposite directions ensures a secure post.
- After the concrete is completely dry, fill in the hole with dirt and seed around the post for a neat appearance.



Step 6

PROPER GROUNDING OF OUTDOOR FIXTURES

- If the conduit used in underground wiring does not connect to a grounded box, cable with a grounding conductor must be used.
- Every outdoor lamp part exposed to the touch must also be grounded. See this image for one way to properly ground an ordinary post lantern. Use this same grounding procedure for almost any outside lighting installation.
- Ground all weatherproof outlet boxes to an outdoor grounded box. The first image below illustrates how to do this.
- The second image below illustrates how conduit can connect to outlet and switch boxes. Some conduit connects with a nut and bushing (part A), while other conduit connects by means of a nut and set screw (part B).
- Ground Fault Interrupters are required in most areas for outdoor circuits. Follow the manufacturer's instructions for the installation of the type of GFI you decide to use. Two basic types are illustrated in (see third image below).



Step 7

INSTALLING TIMER SWITCHES IN OUTDOOR LIGHTING

- Many of the newer outdoor lights come equipped with photoelectric eyes or motion sensors, or both. The photoelectric eye turns the light on in the evening and off in the morning. The motion detector turns the light on when it senses motion in the range of the detector. If your light does not have this type of control built in, you may wish to add a timer, photoelectric eye or a motion detector. These devices allow for automatic operation and a greater sense of security.
- Permanent timer switches are readily available and can be pre-set for any on/off times (see image). Follow the manufacturer's instructions carefully when installing a permanent timer switch.
- You may also use portable timer switches with plug-in equipment for outdoor lighting. Use this type of timer switch as you would any other appliance.



Check your state and local codes before starting any project. Follow all safety precautions. Information in this document has been furnished by the National Retail Hardware Association (NRHA) and associated contributors. Every effort has been made to ensure accuracy and safety. Neither NRHA, any contributor nor the retailer can be held responsible for damages or injuries resulting from the use of the information in this document.