



LOW-VOLTAGE TRANSFORMER
QUICK START GUIDE
PLANNING GUIDE
INSTALLATION GUIDE

Applies to Models:

75W, 150W, 300W, 600W, 900W, 1200W

ATTENTION:

Please read this guide carefully to ensure safe and efficient operation of this Power Supply.

SAFETY GUIDELINES

Low voltage installation and maintenance is safe and presents no risk for electric shock injury. However, there are regulations that may apply and that should be followed by installers. The following safety points may or may not be included in these regulations - the installer is responsible for ensuring a compliant installation.


- ▶ **Warning!** RISK OF SHOCK. Install power unit at least 5 feet (1.5m) from pool or spa and at least 10 feet (3.05m) from a fountain.
- ▶ Power supply must be connected (using supplied power cord) to GFCI-protected receptacle. If the receptacle is outdoors then it must be protected by an in-use weather-proof cover. Only licensed electricians can work with 120V wiring.
- ▶ All power supplies are indoor and outdoor rated, but we recommend that the transformer be mounted outdoors. If mounted indoors, then codes should be followed that apply to indoor wiring - especially for wires that pass through exterior walls.
- ▶ Power supply must be mounted in a vertical orientation with the bottom plate at least 1 foot from ground.
- ▶ It is normal for the unit to become hot; do not allow contact with PVC or plastic sidings. In hot climates, avoid mounting in direct sunlight, but allow photocell to be exposed to sky. Near salt-water, protect unit by enclosing in weather-proof structure.

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START HERE

▶ Ready to Install?

If you already designed your system, estimated voltage loss, purchased the transformer and wire, and understand the basics, use the [Quick Start Guide Steps](#) on the next page. 

▶ If Not . . .

◆ Choose a Transformer

Go to page 6.

◆ Choose Wire & Predict Voltage Loss

Go to page 8.

◆ Select a Wiring Method

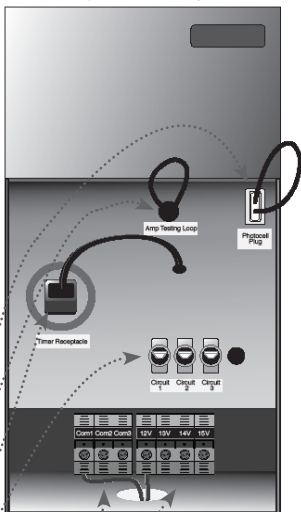
Go to page 11.

◆ Get Detailed Installation Instructions

Go to page 12.

Quick Start Guide Steps

1. Unpack transformer.
2. Read safety instructions.
3. Run wires from transformer to fixtures or hubs.
4. Attach all wires to 12V tap.
5. Measure voltage at fixtures.
6. If needed, move wires to correct voltage taps to achieve acceptable voltage at fixtures.
7. If desired, connect timer and photocell.
8. Set timer.
9. Check that all connections are secure.



Photocell Plug

Testing Loop

Timer Receptacle

Secondary Breakers

Common Taps (300W/25A Max.)

Voltage Taps

Note: Each paired wire is split -
one leg to a Common Tap, the
other leg to a Voltage Tap.

A TRANSFORMER SIZING

Transformer selection is primarily based on Total Fixture Load:

Total Fixture Load (watts or volt-amperes*) \div 0.7 = Min. Transformer Capacity

Example 1: Adding wattage of all fixtures in system equals 230 watts; divide by 0.7 to equal 329 watts - that would be minimum transformer capacity. A 300W transformer would be too small; a 600W model would be ideal.

***Note for LEDs:** if the system contains LED light sources, then fixture wattage values should be divided by "power factor (pf)" or by a typical value of 0.7 (if actual pf is not known).

Example 2: Adding wattage of all LED fixtures in a system equals 230 watts; divide by power factor of 0.7; divide again by 0.7 to equal 470 volt-amperes minimum capacity. A 600W transformer would still be ideal.

B CHECK COMMON & VOLTAGE TAP LOAD

There are two types of connectors (Terminal Blocks) in the transformer used to connect wires. The first, Common Taps, are used to connect one leg of each paired wire coming from the field. The other leg from each pair is connected to one of the other types of taps – Voltage Taps. Common Taps and Voltage Taps have different load requirements - see next page.

SELECT YOUR TRANSFORMER SIZE

$$\left(\frac{\text{Total Fixture Watts}}{\text{If LED (pf or 0.7) If halogen (1)}} \right) \div 0.7 = \text{Minimum Transformer Capacity (Watts or Volt-Amps)}$$

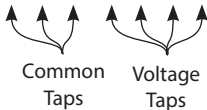
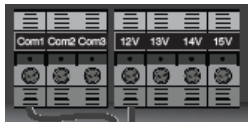
EXAMPLE: (10) 7.0W LED fixtures with 0.8 power factor.

$((10 \times 7.0W) \div 0.8) \div 0.7 = 125W$ Min. Transformer Size (Closest available model is 150W)

Quick Transformer Total & Tap Load Guidelines

- ▶ Total Lighting Load: < 70% Transformer Capacity
- ▶ Lighting Load on Each Common Tap*:
 - < 53W for 75W model;
 - < 105W for 150W model; and
 - < 210W for all other models
- ▶ Lighting Load on Each Voltage Tap:
 - < 70% Transformer Capacity

*For LED sources: Divide lighting load wattage by power factor or 0.7



C SELECT YOUR WIRE

Different wire gauges (such as #10/2 or #12/2) have varying load limits. For this reason, you need to select a wire type and determine how many fixtures you can add to each wire.

Load on Single Wire. For a quick guideline for loads on wire runs, see flow chart on p. 10. For more accurate calculations, see p. 9.

D PREDICT VOLTAGE TAPS

All VOLT transformers are Multi-Tap - giving you a selection of voltages for your wire run connections. Selecting a higher voltage at the transformer compensates for voltage that may be lost along wire runs. The goal is to provide each fixture with an acceptable voltage.

- ▶ Halogen Lights - Acceptable range: 10.5V to 12.0V
- ▶ LED Lights - Acceptable range: 9V to 15V

The extent of voltage loss along the wire depends on distance, lighting load, and wire gauge. It can be calculated through a simple calculation. See next page.

When voltage loss is determined, add that number to 12V to arrive at the voltage tap that will be required so the fixtures receive 12V.

Guidelines for Wire Loads

- ▶ Flow chart on next page is a good general guide for determining what gauge wire to use for your system. You can double-check your choice by using the following guide.
- ▶ Suggested maximum load on a single wire:
 - ◆ #8/2: 300W/25A ◆ #14/2: 70W/5.8A
 - ◆ #10/2: 144W/12A ◆ #16/2: 48W/4.0A
 - ◆ #12/2: 100W/8.3A
- ▶ Best practice is to spread loads among wire runs and common taps. Also, for wire runs that share a voltage tap, connect them all to a single common tap.
- ▶ To check loads on a single tap, bundle all wires entering the tap then encircle them with an ammeter clamp. Check the amp readings against maximum values above.

Voltage Loss Calculation

$$\left(\frac{\text{Distance (Ft.)} \times \text{Load (W)} \times 2}{\text{Cable Constant}} \right) \div \text{Cable Constant} = \text{Voltage Loss}$$

Wire Gauge	Cable Constant	Wire Gauge	Cable Constant
#18/2	1380	#12/2	7500
#16/2	2200	#10/2	11920
#14/2	3500	#8/2	18960

Example: A 100' run with 150W load using #12/2 wire.

$(100 \times 150 \times 2) \div 7500 = 4V$; $12V + 4V = 16V$ Tap to deliver 12V at fixture.

What gauge cable should I use for my Landscape Lighting System?

PLANNING

Will you be using Halogen or LED fixtures?

HALOGEN or BOTH

LED

Is length of farthest run more than 100 feet?

Is length of farthest run more than 100 feet?

NO

YES

NO

YES

#12/2 cable

Is length of farthest run more than 200 feet?

Is length of farthest run more than 200 feet?

NO

YES

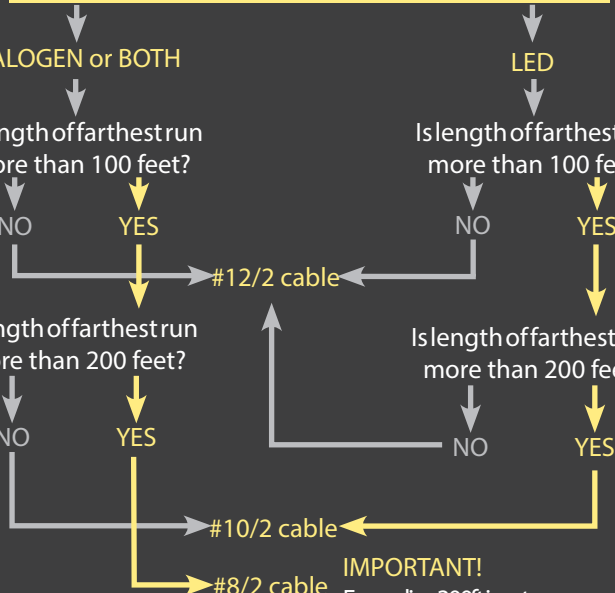
NO

YES

#10/2 cable

#8/2 cable

IMPORTANT!
Exceeding 300ft is not recommended.



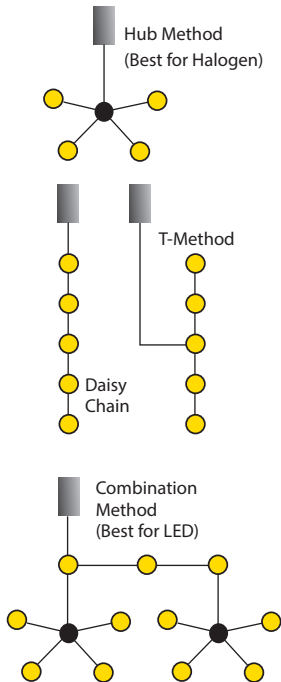
E WIRING METHODS

There are three main wiring methods to bring power to lighting fixtures.

Hub Method: Single homerun wire from transformer to a junction box. From that box, several fixtures are connected. This is preferred method for halogen light sources.

Daisy Chain & T-Methods: All fixtures are connecting to a single wire in a continuous chain. When the transformer connects to the first fixture, it is a Daisy Chain; when connected to the center fixture, it is the T-Method. Both methods can result in significant voltage loss from first to last fixture (though the T-Method is better) so these should only be used for shorter runs and with fixtures with wide voltage ranges (LEDs).

Combined Hub/Daisy Chain/T-Method. This is used solely for LED systems and is the best method to conserve wire and labor while still providing acceptable voltage at these low-wattage fixtures.



1 UNPACK TRANSFORMER

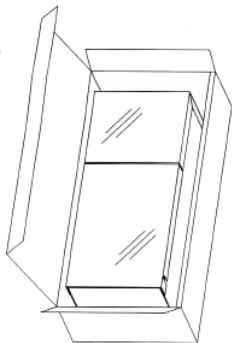
Open shipping carton and carefully remove the transformer, accessories, and hardware.

Note that transformer mounting hardware is not included, although bottom plate hardware is included. Inspect contents for any damage that may have occurred during shipping.

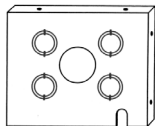
Bottom Plates feature knock-outs for wire runs - they can be used with or without conduits (fits nominal sizes: 1/2", 3/4", and 1 1/4") (not included). Running the wire through a conduit from the transformer into the ground makes for a cleaner final appearance.

2 MOUNT TRANSFORMER

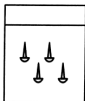
Mount transformer to solid surface or stand using stainless steel screws and anchors (if needed) (hardware not included). Screws will pass through keyholes. Use bubble level to ensure vertical mounting. Bottom of transformer must be at least 1 foot above ground.



Mounting
Hardware
not included

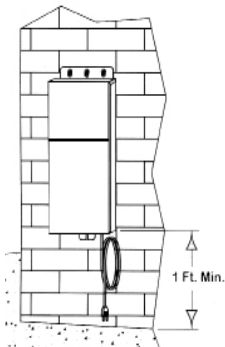


Bottom Plate
(appearance differs among
models)



Bottom Plate Hardware Bag

(Note: Bottom plate is already attached
in some models)



Mounting Tips

- ▶ GFCI-Protected 120V receptacle with in-use weather-proof cover required. Do not attempt to install or service this receptacle - contact a licensed electrician.
- ▶ Optional - Use PVC conduit (from ground to transformer) to contain wires from the field. Knock-outs accommodate nominal pipe sizes of 1/2", 3/4", and 1 1/4".
- ▶ Mark field wires with provided colored strips and dots to aid in identification.

3 INSTALL FIXTURES & LAMPS

Place fixtures in final locations and install lamps (bulbs) if needed.

4 DIG WIRE TRENCHES

Using a narrow shovel or spade, dig trenches (6" deep) for wire runs to all fixtures.

5 RUN WIRE

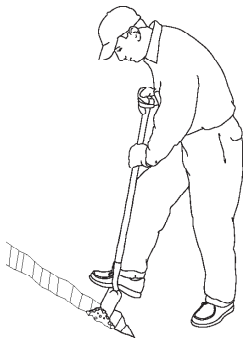
Starting at transformer, leave an extra 3 ft. of wire, then run wire through trenches to junction and/or fixture locations. Mark each wire with provided colored tape on both ends. Record location of wire run (and its fixtures) in form on back of transformer lid. Place colored dot on form to match wire color with form entry.

INSTALLATION TIPS

Fixture Installation: Initially, lay fixtures on ground at expected locations. Complete wire trenching and wire connections before driving stake in ground (or mounting by other methods).

Wire Trenching: Keep trenches as narrow as possible (for minimal disruption of turf). A large flat trenching shovel can be used to cut into turf, then rocked back and forth – to provide a slit in turf without removing soil. This slit can then be pushed closed after insertion of wire.

Wire Running. As indicated on previous page, don't forget to mark both ends of wire and transformer record form with colored stickers to allow for future identification of wires. At each fixture location, leave a coil of wire - long enough to allow for moving the fixture if that should be needed.



6 MAKE TRANSFORMER CONNECTIONS

Loosen screws that hold bottom plate in place, and remove plate. Run lighting cables through knockouts in bottom plate. (If desired, attach conduit (not included) to enclose cables.)

Separate legs from each wire pair and strip wires 1" from end.

Insert 1 leg from each pair into the 12V tap. (This is for testing purposes.) Insert the other leg from each pair into one of the common taps (if there is more than one common, spread the field wires equally among all commons).

Make sure that all connecting screws are secure and tight.

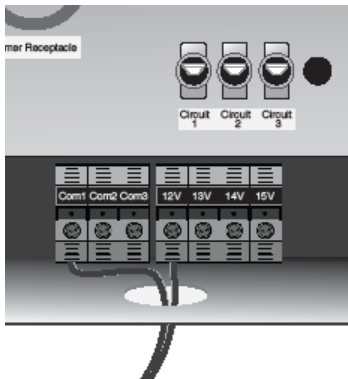
7 MAKE FIXTURE & JUNCTION CONNECTIONS

If needed, trim and strip fixture wires to prepare them for connection to field wires. Connect these wires with temporary dry connections using simple wire nuts so voltages can be checked prior to sealing connections.

However, if the fixture has a bi-pin input then voltage can be checked there - so wire connections can be finished and sealed.

CAUTION:

Unplug transformer from 120V power while making connections. Switch all secondary breakers to “Off” until all connections are finished.

**Initial Transformer Connections**

- ▶ As described on previous page, all fixtures are initially connected to 12V. This is for testing purposes only. You will make these 12V connections then test voltages, then go back to transformer and move wires (if needed) to other voltage taps.
- ▶ If all wires do not fit into the 12V tap, then use a large wire nut to connect all wires - with a heavy gauge (#10 or #8) wire to connect wire nut to 12V tap - this is temporary - only for testing.

Initial Fixture Connections

- ▶ Ideally, you will connect fixtures and install bulbs so you have at least one place where you can test voltage at the fixture with the bulb powered on. This could be at the wire junction or at the fixture socket.

8 CHECK LAMP VOLTAGES

Back at the transformer, plug into 120V receptacle and switch on all secondary breakers.

Check the voltage at each fixture using a voltmeter, and make sure you have the proper voltage to the bulb or integrated LED source. Note that voltage can be checked at the socket (as illustrated), but it is preferred to check voltages while all fixtures in the system are on. This ensures that you are testing the system under full load.

Ideally, you will connect meter probes to wire connection or by inserting the lamp partway into socket and touching leads to exposed pins.

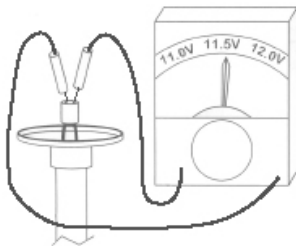
Record voltages on note pad then return to transformer.

9 ADJUST VOLTAGE AT TRANSFORMER

Back at the transformer, turn off all secondary breakers, then take each fixture wire (one-at-a-time) and (if needed) move each wire to the correct voltage tap that will increase the voltage to be within the acceptable range.

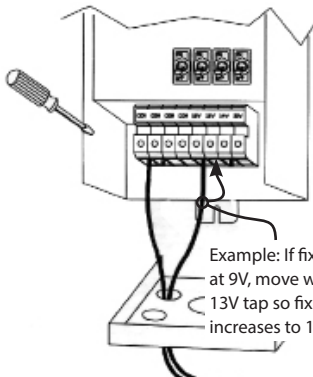
Testing Fixture Voltage

Voltage tested by inserting probes into socket. A more accurate method is to test voltage at the wire connection while bulbs are in place, so testing is under full load. Another method is to partially insert lamp so pins are exposed and accessible to probes.



Example:

Fixtures on wire #1 measured 9.0V - indicating a loss of 3 volts (from initial 12V tap). By adding 2V (moving wire to 13V tap), the fixture will increase by 2V for an acceptable 11.0V.



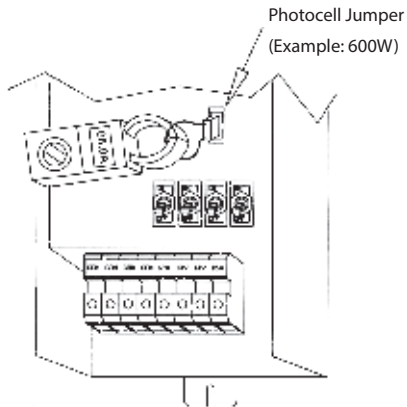
10 CHECK INPUT AMPERAGE

Your transformer is provided with a long loop in the optional photo-cell outlet. Use this loop to measure the input current. Simply apply the clamp on the Amp Meter around the loop and measure the current. (See chart on next page.)

DO NOT EXCEED THE MAXIMUM INPUT CURRENT!

If input current exceeds the maximum rating, either remove fixtures or reduce lamp wattages in the fixtures until input current is sufficiently reduced.

The transformer is marked with a label showing the maximum input current.



Transformer	Max. Amps	Transformer	Max. Amps
75W	0.6A	600W	5.0A
150W	1.2A	900W	7.5A
300W	2.5A	1,200W	10.0A

Maximum Input Current for Various Size Transformers

For Questions & Support

Contact Customer Support at:
813.978.3700 or customersupport@voltlighting.com

Warranty Information

www.voltlighting.com/warranty

www.voltlighting.com



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