



BRILLIANCE LED LANDSCAPE LIGHTING

TROUBLESHOOTING BASICS


BRILLIANCE LED[®]
A HIGHER LIGHT FORM[®]

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COMMON ISSUES

- Lights will not come on.
- Lights stay on.
- The circuit breaker on the Transformer is tripping.
- Lights in one section are not working.
- Lights in some areas are dim.



CHECKING FOR POWER

CHECK FOR POWER TO THE TRANSFORMER AT THE RECEPTACLE

- Set your voltmeter to VAC.
- Check for a grounded circuit.
- Insert the Black probe into the U slot and the Red probe into the short slot on the receptacle.
- VAC should read 110-120VAC.
- Check the GFCI if there is no power.



CORRECT PROCEDURE



CHECKING FOR POWER

CHECK THE GFCI

- Unplug the Transformer.
- Lift up the receptacle cover.
- Check the reset button on the GFCI.
- Reset if necessary.
- Recheck the voltage.
- Install a weatherproof cover if needed.

RESET GFCI

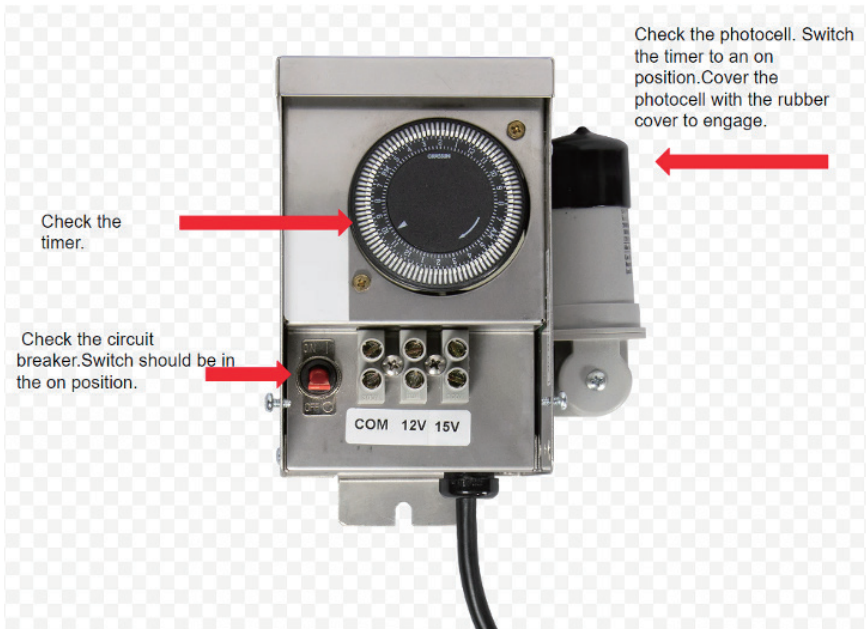


INSTALL WEATHER PROOF COVER



LIGHTS WILL NOT COME ON / LIGHTS STAY ON

- Control issues are the #1 problem with lighting systems staying on and turning off.
- Once you have power to the Transformer check the controls.
- Plug in the Transformer.
- Check the circuit breaker switch. Switch should be on.
- Check the timer. Timer should be set to an on & off time.
- Check the photocell. Turn on the timer and cover the photocell.



THE CIRCUIT BREAKER ON THE TRANSFORMER IS TRIPPING

COMMON REASONS

- Short on a cable.
- Overload on a cable.
- Pinched cable.
- Bad LED Lamp.

USE A CLAMP VOLTAGE METER TO TROUBLE SHOOT



USING THE CLAMP METER TO TROUBLESHOOT

1. Set the meter to amps.
2. Clamp around one of the cables and turn on the Transformer. You should see the Amp reading on the screen.



3. Finding the cable causing the short or overload.
4. Clamp on to each wire on the common individually.
5. This will help isolate the problem cable.
6. Check each cable one by one.
7. You will need to continue to reset the circuit breaker for each cable checked.
8. View the read-out screen on the voltmeter.
9. The amps will soar on the cable causing the issue.
10. After identifying the cable causing the issue.



USING THE CLAMP METER TO TROUBLESHOOT

11. Remove the cable from the terminal block on the Transformer.
12. Be sure all the other cables are connected to the terminal blocks on the transformer.
13. Walk the job. Look for any damaged or leaning fixtures.
14. Look for any cables or connectors that are out of the ground.
15. Look for cable pinched by staples on a tree or structure.



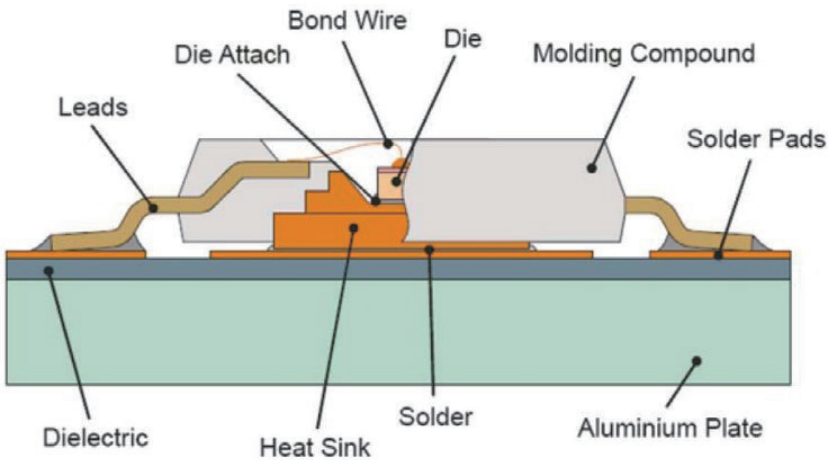
TROUBLESHOOTING PROCESS/ LAMP CHECK

1. Find the suspect fixture.
2. Turn the Transformer back on.
3. Remove the lamp.
4. If the lamp is halogen or incandescent. Use your voltmeter and check for continuity. (LED Lamps will not show continuity even if good.)
5. Turn the Transformer on.
6. If the breaker does not trip, shut off the Transformer and replace the lamp with a new one.
7. Do not plug the new lamp with the power on.



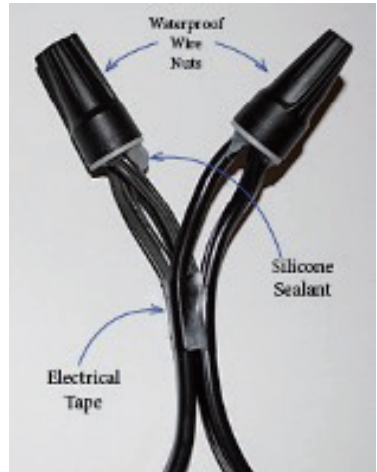
ELECTRICAL OVERSTRESS

- Hot Plugging can lead to electrical overstress.
- If an LED lamp is plugged in while the power is on, an electrical arc can cause the bonding wire to burn thus taking out the diode.
- This can also occur through a loose cable connection or a worn-out socket.



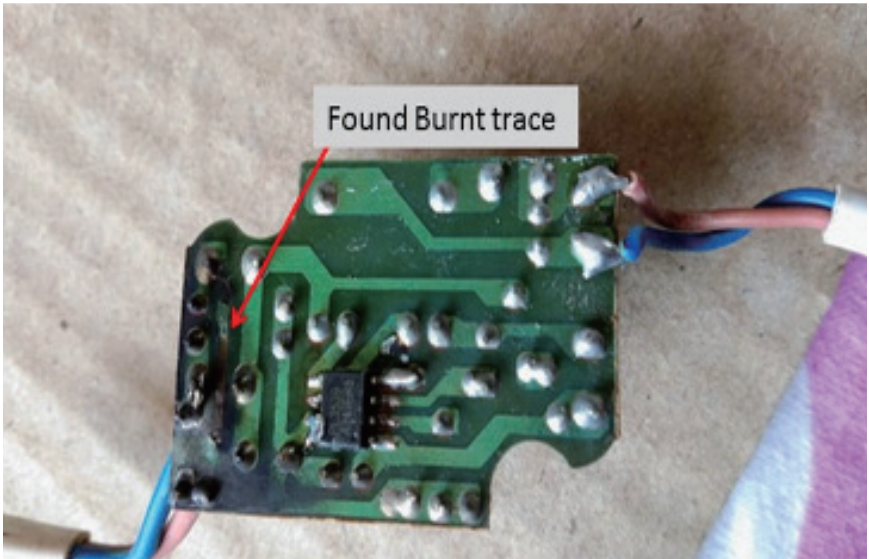
OTHER CAUSES OF ELECTRICAL OVERSTRESS

- Cut wire (Shovels and garden tools can cut cables in one spot.)
- Loose connection at a junction or central hub. (Keep connections tight. Read and follow the manufacturers instructions for all wire connections.)



LIGHTS ARE DIM OR FLICKERING COMMON CAUSES

- Bad driver in an LED lamp or fixture. Lamps or integrated fixtures can flicker if a driver is damaged.
- LED could be made for DC applications only.



CABLE ISSUES



CABLE ISSUES

- Reducing the strands on landscape cable through improper stripping or nicks can give a false reading on your voltmeter.
- One will read voltage but have no 12V current to allow the lamp to illuminate.



STRIPPING CABLE

PROPER STRIPPING

- This cable stripping tool is the most common style that is used for landscape lighting.
- It is made to strip solid cable, not stranded.



IMPROPER STRIPPING

- This cable stripping tool has cut the insulation and several strands on the cable.
- When this happens the gauge of the cable has been corrupted. This is a good place for heat to build up.



THE BITE AND BREAK METHOD

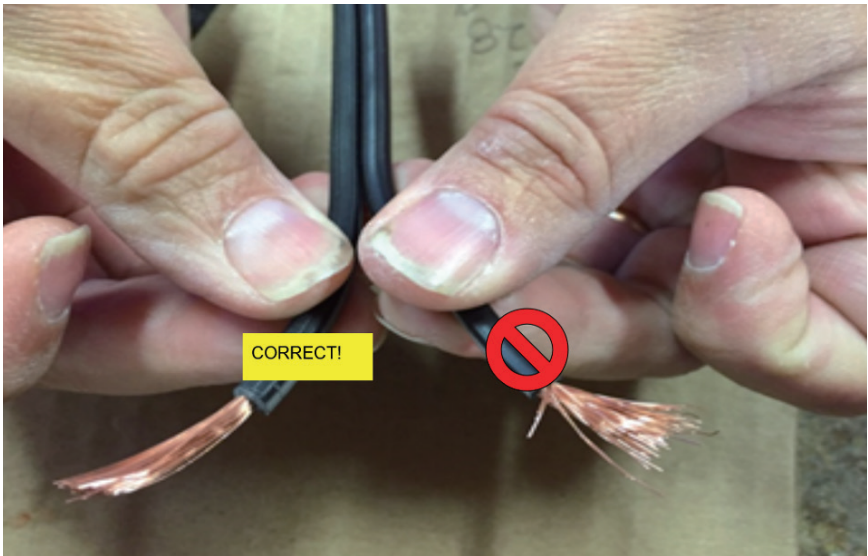
- This cable stripping tool has scored the insulation jacket.
- Bend the jacket with the plier tip to break the insulation jacket.
- Pull the insulation off of the cable.



STRIPPING CABLE

THE BITE AND BREAK METHOD RESULTS

- The cable on the left is clean and free of corruption.
- The right side has been corrupted and has lost many strands.

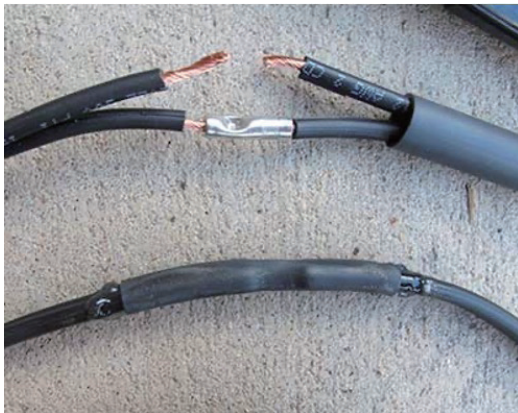


POOR CONNECTIONS LEAD TO TROUBLE!

Loose cable connections cause heat. Where there is heat, there can be fire. When using any connector be sure to read all of the specifications. DO NOT eyeball the size of the connection and assume anything! Many connectors are smaller on the inside.



CABLE CONNECTION DEVICES



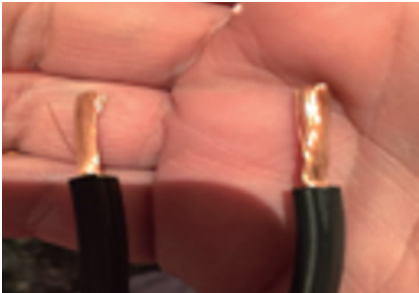
INSTALLING CABLE INTO A TRANSFORMER



- Loose terminal blocks inside a transformer can cause fires
- ALL electrical connections must be tight to avoid overheating

STEP 1

- Use the Bite and Break method to remove the insulation from the cable.
- Be sure the cable is intact and no strands are broken.
- The 2 conductor landscape cable has a side with printed specification, and another that has grooves or lines molded into the jacket.



STEP 2

When two or more conductors are needed for installation, it is a practice to separately twist the printed slides together and separately twist the grooved sides together.



CONTINUED

STEP 3

- Power supply terminal blocks may vary from manufacturer.
- The picture on the left is an example is a common style. This is the front.
- Using a flat blade screwdriver loosen the terminal block turning it counter clockwise.
- The terminal block should be completely open as seen in the picture to the right.



STEP 4

- Insert the twisted cable into the throat of the terminal block and hold it in place. Begin tightening the terminal block screw clockwise until snug.
- Once tightened, using a circular motion move the cables around.



STEP 5

- Tighten the terminal block screw clockwise. The screw should be able to turn at least one to two times.
- Gently pull down the cable to check for any slippage.



The cable should now be nice and tight in the terminal block.

Following this practice will help ensure a mechanical cable connection.

LOOK FOR UNDERSIZED TRANSFORMERS

- Check the Transformer to see if it is too small for the job.
- Transformers should only be loaded to 80% capacity.
- Use the Volt Amp formula to figure out the total load on a transformer
- Face value of the Lamp or Fixture x 1.67 = Total draw on an AC transformer

SIZING THE TRANSFORMER USING VOLT AMPS

LIGHTING SYSTEM

Equation:

Wattage x (1.67) = Actual Draw,

Actual Draw x Number of Units = Watt Usage

(7) 4W MR 16 Lamps

$4W \times 1.67 = 6.68 \times 7 = 46.76$ Watts

(9) 3W G4 Lamps

$3W \times 1.67 = 5.01 \times 9 = 45.09$ Watts

Round Up

$47 + 46 = 93$ Watts entire system.

150W - 300 W Transformer is a valid choice



VOLTAGE DROP FORMULA

CALCULATING VOLTAGE DROP

$$\frac{\text{Total Watts on Cable} \times \text{Length of Run} \times 2}{\text{Cable Constant}} = \text{Voltage Drop}$$

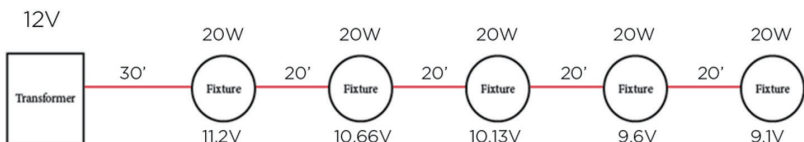
CABLE SIZE CONSTANTS	
#18	1380
#16	2200
#14	3500
#12	7500
#10	11920
#08	18960
#06	30150

DAISY CHAIN VOLTAGE DROP CALCULATION

In this diagram, the Transformer is the 12V tap for the 12-2 cable. Each fixture on the 12-2 cable is 20 Watts each, 100 Watts total.

You will see excessive voltage drop to the halogen lamps at the end of the run. None of the lamps are burning evenly. Changing this system to LED would be advisable.

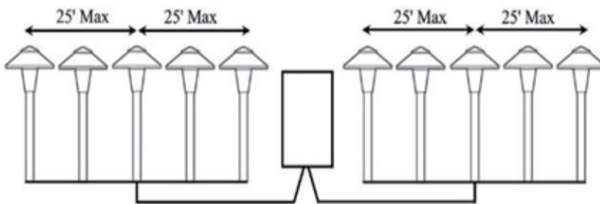
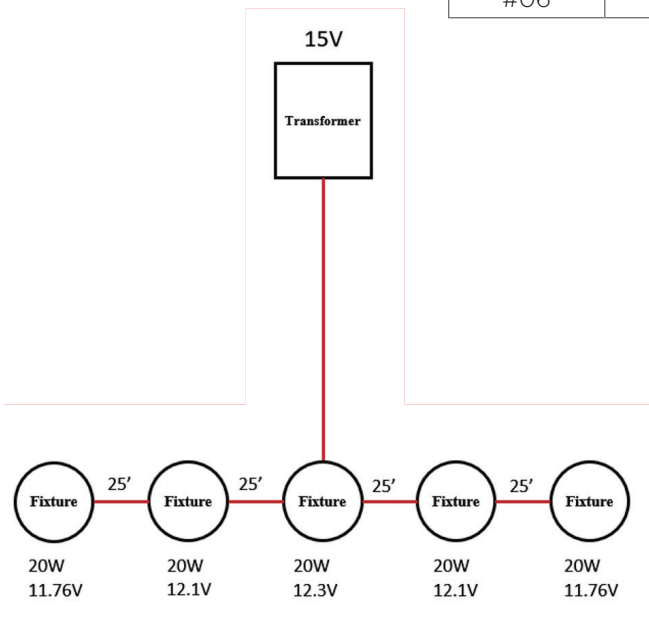
CABLE SIZE CONSTANTS	
#18	1380
#16	2200
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CENTER FEED (SPLIT TEE)

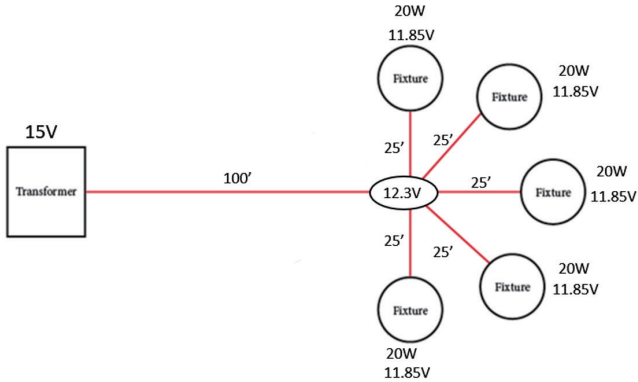
In this diagram, there is 100' 12-2 from the Transformer to the central point. Each fixture has 25' of 12-2 cable and a 20 Watt halogen lamp inside. There is 100 Watts on the total system. Transformer is set on the 15V tap.

CABLE SIZE CONSTANTS	
#18	1380
#16	2200
#14	3500
#12	7500
#10	11920
#08	18960
#06	30150



CENTRAL POINT (HUB) VOLTAGE DROP CALCULATION

In this diagram, there is 100' 12-2 from the Transformer to the central point. Each fixture has 25' of 16-2 cable and a 20 Watt halogen lamp inside. There is 100 Watts on the total system. Transformer is set on the 15V tap.



THINGS TO REMEMBER WHEN TROUBLESHOOTING

- 1 Remain Calm.
- 2 Be sure you have adequate time.
- 3 Bring an extra hand if needed.
- 4 Have the correct tools.
- 5 Don't be afraid to reach out for problem solving assistance.
- Your lighting manufactures all have Tech departments with knowledgeable staff. Reach out to them.
- Contact your distributor or manufacture rep for field assistance.

BASIC TOOLS REQUIRED FOR TROUBLESHOOTING

- Clamp Meter
- Wire strippers
- Multi Tip Screwdriver
- Hand trowel
- Drain spade





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