



# TROUBLESHOOTING LED DOWNLIGHTS



## Troubleshooting LED Downlights

From time to time issues arise with the performance of LED recessed lighting products after installation. Due to the newness of LED technology it can be difficult to diagnose and remedy these problems. Below is a list of problems that may occur, how to diagnose the cause and what the remedy might be:

### Problem: Flickering or Flashing

#### Possible Cause #1: *Incorrect Voltage*

**LED downlights have a specified input voltage. Incorrect voltage to the driver can cause the LED to flicker or to flash on and off.**

- remedy*
- Check the input voltage of the driver (Ex: 120V) then check the voltage being delivered to the fixture (Ex: 277V). There may be a mismatch. If possible, replace the driver on the downlight for one with the correct input voltage to match the line voltage or, if that is not an option, install an applicable voltage transformer to the line voltage to achieve the required input voltage for the original fixture.

#### Possible Cause #2: *Incompatible Dimmer*

**If the LED downlight was not designed for a particular dimming load or if the driver is not compatible with the dimming control then issues may occur.**

- remedy*
- Try bypassing the dimming circuit. If the LED functions normally then an incompatible dimmer or dimming load may be the issue or the driver is not a dimming driver. Consult factory to determine whether the driver is dimmable and, if so, what kind of dimmer is compatible with the driver. Please check this web link for a list of factory qualified compatible dimmers: [http://www.liton.com/webcatalog/brochures/wp\\_dimmingfacts.pdf](http://www.liton.com/webcatalog/brochures/wp_dimmingfacts.pdf)

#### Possible Cause #3: *Occupancy Sensor/Control Rated Wattage*

**These controls sometimes have a minimum rated wattage in order to function correctly. For example, there maybe a minimum of 20W required for the control unit but the LED might only consume 10W.**

- remedy*
- Add additional fixtures to the circuit to get to the required wattage for the dimming control or replace the dimming control unit with one that has a lower wattage requirement.

continue...

## Problem: Flickering or Flashing cont..

### Possible Cause #4: *Dimmer Overload*

A common problem with LED dimming is the inadvertent overloading of the LED driver. LED drivers are rated for a maximum load (measured in volts, amps and/or watts) that must not be exceeded.

The number of lamps that can be installed on a single-phase control dimmer may seem to be an easy calculation. For example, suppose you want to know how many 15W LED fixtures can be installed on a 600W dimmer. You might divide the 600W by 15W and determine that you could control 40 fixtures. Unfortunately, that result might be wrong. In fact, you may only be able to use 6 LED fixtures on a dimmer rated for 600W.

Even though the LED fixture may draw only 15W continuously, there may be a start-up in-rush current or a repetitive half cycle surge that makes the dimmer think that the current is much higher. That 15W LED fixture may appear to the dimmer as a 100W incandescent load. If that happens and you are using more than 6 LED fixtures, you will overload the dimmer.

The average start-up or half-cycle stress that has been observed is the equivalent of a 100W incandescent lamp, even for LED loads of less than 20W!

#### *remedy*

- For 10W & 15W Liton –DLV products, consult the charts in the LED Dimming Facts Guide to reference tested maximums by dimmer.
- Remove the dimmer from the line to see if the problem is solved.
- Change dimmer to one with a higher maximum load.
- Split the circuit into multiple loads.

### Possible Cause #5: *Dimmer Underload*

Some dimmers may not perform well if too little load is put on them. A minimum number of fixtures may be required to operate correctly due to the 25W – 40W minimum load that most incandescent dimmers require to operate correctly under all conditions. When using incandescent bulbs, the minimum load requirement was easily met. However, with LED four or more loads may be required for a dimmer to reach the required minimum load.

#### *remedy*

- For 10W & 15W Liton – DLV products, consult the charts in the LED Dimming Facts Guide to reference tested minimum by dimmer.
- Remove the dimmer from the line to see if the problem is solved.
- Change dimmer to one with a lower minimum load.

## Problem: Fixture Not Lighting

### Possible Cause #1: *Incorrect Wiring*

Poor connection between the LED and the driver, a poor connection from line voltage to the housing.

- remedy*
- Check all electrical connections between the LED and the driver and between the line voltage and the driver and make sure that voltages are correctly matched. Make sure that all circuit breakers are turned on for the affected housing and that the switch controlling the housing is turned on. Make sure that all wire nuts and quick-connectors are properly installed.
  - Check all wiring connected to the housing including input and grounding, dimming circuits, emergency battery back-up devices or Generator Transfer devices.

### Possible Cause #2: *LED Damaged by Environmental Factors*

LEDs can be damaged by excessive vibration, moisture and chemical or aerosol contamination.

- remedy*
- If possible, first confirm that the LED trim is the issue by installing a known good trim into the affected housing while the power is off.
  - HVAC equipment or machinery can create excessive vibration that can affect the LED if it occurs within close proximity to the housing. Check for the proximity of these conditions to the housing and eliminate or reduce the vibration or if necessary, by increasing the distance between the vibration and the LED housing.
  - Damage caused by liquids or contamination by chemicals or aerosols can cause the LED to malfunction or fail. Eliminate any of these issues, if discovered, before attempting to service the housing.

### Possible Cause #3: *LED Damaged by Other Factors*

Like any other lamp source, LEDs can be damaged by physical impacts including accidental dropping.

LEDs can be damaged by power surges that occur when installing the trim while the power is on.

- remedy*
- If possible, first confirm that the LED trim is the issue by installing a known good trim into the affected housing while the power is off
  - Check for visible damage on the LED trim.
  - Be sure that the power is turned off when connecting the LED trim to the driver.

### Possible Cause #4: *Driver Has Been Damaged*

LED drivers have a specified input voltage. Incorrect voltage to the driver can damage it. Incorrect wiring and poor electrical connections may also damage LED.

- remedy*
- Check the input voltage of the driver (Ex: 120V). Then check the voltage being delivered to the fixture (Ex: 277V). There may be a mismatch. (See Possible Cause #1 Remedy).
  - Try installing the trim from the affected housing into a known working housing. Remember to install with power OFF. If it fails to light the trim may be at fault.
  - Check all wiring involving the driver including input and grounding, dimming circuits, emergency battery back-up devices or Generator Transfer devices. Correct any anomaly found in the wiring. If the problem persists then the driver may be damaged. Consult factory.

## Problem: LEDs Have Become Yellow or Discolored

### Possible Cause #1: *Incompatibility Between LED and Housing*

The LED trim may be incompatible with the driver. Ex: a 6" 10W trim installed into a 6" 15W housing.

*remedy*

- Most LED trims will fit the same size aperture housing. However, depending on the lumen package in the trims and the driver on the housing, they may not be compatible even though they look the same. Please check with the vendor or the factory to determine that the LED trim is paired with the correct housing. If they are not then a new trim with the correct wattage should be ordered.

### Possible Cause #2: *High Ambient Temperature*

High ambient temperature may be present. Heat is the enemy of LED technology and can shorten its life significantly. High ambient temperatures may be caused by HVAC systems, by high-density insulation covering a non-IC housing and by installation in areas with shallow plenums. Weather or climate can play a significant role in hot, dry desert areas and locales with heat and humidity combined.

*remedy*

- If possible, test the ambient temperature in the area of the fixture, both above and below the ceiling. If the ambient temperature around the fixture consistently exceeds 50°C, the LED will be damaged and not perform as expected. Correct the problem by reducing the ambient temperature or moving the fixture. Note that doing this will not cause the LED to function correctly. Consult factory for a replacement trim.

### Possible Cause #3: *High Ambient Temperature*

At the end of useful life (L70) LEDs may exhibit changes in Kelvin temperature, CRI and lumen output. This is an indication that the LED trim may need to be replaced.

*remedy*

- Consult factory for a replacement trim.

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