



307-T1W

LED 10 PACK

All Scales
Digitrax LED 10 Pack

Features

- Allows you to substitute LEDs in place of filament lamps in locomotives

Parts List

10 T1 type LEDs	1 Instruction Manual
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Installation Instructions

LEDs, or Light Emitting Diodes, have no filaments that can burn out so they last longer in locomotive applications than filament lamps. They also require considerably less power than a traditional lamp, and are much cooler. A **resistor** is used to protect the LEDs from receiving too much power and burning out. **Warning: If you wire the leads of an LED directly to your decoder without using a resistor wired in series, the LED will be ruined. It will either burn out immediately or shortly thereafter. LEDs are also polarity and static sensitive.**

Finding the Right Size Resistor

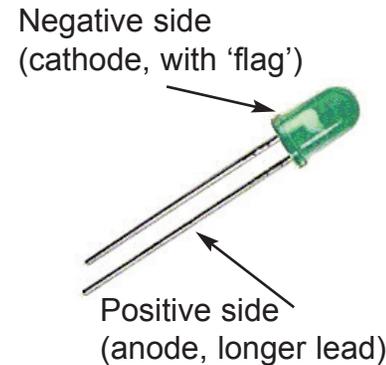
LEDs usually have a "typical" milliamp value and a "maximum" milliamp current value. If this current exceeds the maximum value, then the LED will probably burn out. The goal is to find a resistor that makes the LED light near or below the typical value. Ohm's law helps us figure out the correct resistance for the resistor. Let us assume you will either be using a 12 volt (typical N scale) or 15 volt (HO Scale) layout. These particular LEDs have a 10 milliamp typical current value and a 20 milliamp maximum value. So you want about 10 milliamps flowing through the LED at either 12 or 15 volts.

$$R = V / I = 12 \text{ volts} / 0.01 \text{ amps} = 1200 \text{ ohms or } 1.2\text{K ohms}^*$$

* Properly speaking, this simple formula doesn't taking into consideration the voltage drop across the LED itself, but for our purposes it'll work fine.



You are more likely to find a 1K ohm resistor than a 1.2K ohm resistor so use a 1K ohm resistor in 12 volt systems N scale type layouts. Generally you'll find that a 1K ohm resistor value will work fine in higher voltage HO scale layouts as well - the current flowing through the LED will be higher but will still be within the 'safe' range for the device. We've provided the mathematical formula here for applications of higher or lower voltage than the N scale and HO scale examples given. *Note: If there is any doubt as to what voltage you have at your decoder's lamp outputs you'll need to turn that output on (example, F0 for the front headlight) and measure the output voltage on the decoder PCB with a voltmeter. If you see a range of 12 to 16 volts then you can use a 1K ohm resistor value. If you see a higher or lower voltage, you'll have to calculate a new resistor value using the formula.*



One last reminder - LEDs require **proper polarity** to work. The shorter of the two leads is the negative side and this is the lead that needs to connect to the function (F0, FOR, etc) pads of the decoder. The longer lead **always** connects to the positive, Blue/Common side of the decoder PCB. The resistor can be wired in series to either side of the LED.

Digitrax manuals and instructions are updated periodically. Please visit www.digitrax.com for the latest version.



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