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Fusee Pro

Instructions

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Getting started

Thank you for purchasing a ***Logic Rail Technologies*** product! Please read all instructions prior to installing this board. The Fusee Pro simulates the appearance of a burning fusee (railroad flare). It can also be used to simulate a roadside flare used near a vehicle accident scene. Two fusees are included and can be triggered independently. Rule 99, also known as the Flagging Rule, is part of the General Code of Operating Rules broadly accepted by prototype railroads. Part of Rule 99 states when a train is outside of yard or block signaling limits, or when signaling is not used, the train's flagman must drop a lighted fusee at the rear of a slow-moving train; this requires a train approaching from the rear to stop and wait until the fusee burns out (the nominal burn time for a fusee is 10 minutes), thus keeping trains separated at a safe interval.

To start a fusee burn cycle, you simply "ground" the appropriate trigger input (TR1 or TR2); this can be a simple SPST switch or the output from some other type of circuit. When first triggered, the fusee will light up brightly for an instant to suggest ignition. It will then flicker with varying intensity as it "burns." Repeated activation of the trigger input will NOT extend the current burn cycle; the burn cycle must complete before another trigger event will be recognized. The length of the burn cycle is adjustable from ~38 seconds to ~10 minutes. Refer to the Burn Time Adjustment section on page 2.

You should make all of the connections to the Fusee Pro before applying power to it. You can mount the Fusee Pro anywhere it is convenient underneath your layout using the two mounting holes provided. The holes will accept #4 screws; do not enlarge the holes as damage to the circuit board can result and your warranty will be voided! You should locate the fusees between the rails and drill a small hole (~ 1/16" diameter) to pass the wires through. **The wires are delicate, so don't force the fusee or wires through the opening.**

Wiring

Fusee Pro wiring for one fusee and its trigger input is shown in Figure 1 below. The necessary current limiting resistors for both fusees are already installed on the circuit board. Note that the "black" and "red" designations refer to the color of the insulation on the fusee wires. You can power the Fusee Pro from an AC or DC power source connected to the two AC terminals; polarity doesn't matter! Wiring for the second fusee and trigger is similar and uses the F2 and TR2 terminals. You can use virtually any gauge wire to extend the connections since this is a low voltage, low current device. Take care if you solder wires to the ends of the 36 gauge fusee wires; excessive heat can damage the LED! Alternatively you can use terminal blocks or strips.

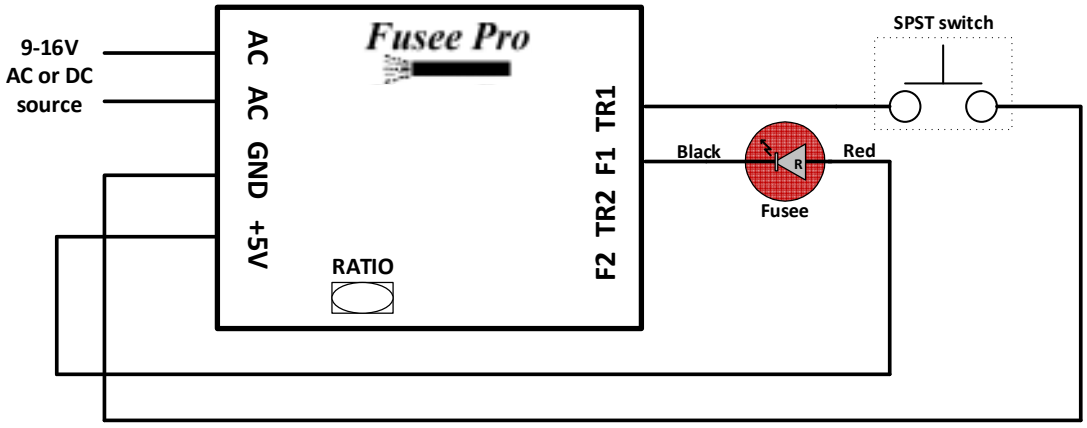
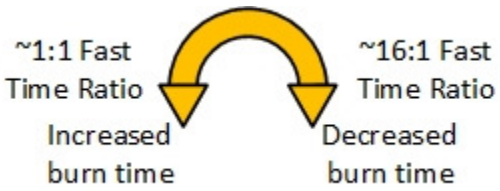


Figure 1 – Wiring diagram

The SPST (Single Pole Single Throw) switches must be of the "Normally Open" variety. We recommend a momentary type of pushbutton switch (e.g. our #PBSPST or Radio Shack #275-1571). You can also trigger the circuit using any device that provides an "open collector" output that switches to ground; you'll have to connect the GND wire of the Fusee Pro to a ground reference on the triggering device (which MUST be powered separately from the Fusee Pro). If you are interested in doing this, and need more help, please contact us!!!

Burn Time Adjustment

The Fusee Pro provides a realistic burn time (typically 10 minutes) aligned to the scale time factor you're operating at. For example, if you are running your operating sessions with a fast clock set to a 3:1 ratio then 10 minutes in "fast time" equates to 3 minutes 20 seconds of real time. The Fusee Pro provides a range of burn times from ~38 seconds (16:1 fast time ratio) to ~10 minutes (1:1 fast time ratio also known as real time!). When NEITHER fusee is burning you can adjust the burn time via the white component labeled RATIO on the lower edge of the circuit board. Use a small slotted head screwdriver to turn the dial. When fully counterclockwise (turned all the way to the left) the burn time will be ~10 minutes of actual time (1:1 fast time ratio). When it is fully clockwise (turned all the way to the right) the burn time will be ~38 seconds of actual time (16:1 fast time ratio). When the dial is approximately midway through its range of movement the burn time will be ~75 seconds of actual time (8:1 fast time ratio). As you can see, rotating from left to right decreases the burn time in actual time which is equivalent to an increasing fast time ratio!



Technical Specifications

The Fusee Pro has the following technical specifications:

Fusee size:	~0.065" diameter x ~0.25" long
Input voltage (min):	9V AC or DC
Input voltage (max):	16V AC or DC
LED output current (max):	20mA (per fusee)

Total power consumption (typical): 25 mA (when both fusees are burning)

IMPORTANT NOTE: LEDs only!!!

The Fusee Pro, unlike its predecessor the Fusee Animator, CANNOT be used with incandescent bulbs of any type, current, or voltage! The Fusee Pro MUST only be used with LEDs.

Warranty

This product is warranted to be free from defects in materials or workmanship for a period of one year from the date of purchase. ***Logic Rail Technologies*** reserves the right to repair or replace a defective product. The product must be returned to ***Logic Rail Technologies*** in satisfactory condition. This warranty covers all defects incurred during normal use of this product. This warranty is void under the following conditions:

1) If damage to the product results from mishandling or abuse.
2) If the product has been altered in any way (e.g. soldering to the circuit board).
3) If the current or voltage limits of the product have been exceeded.

Requests for warranty service must include a dated proof of purchase, a written description of the problem, and return shipping and handling ($6.00 inside U.S./$15.00 outside U.S. - U.S. funds only); if we determine that warranty coverage applies then we will refund the return shipping and handling fee. Except as written above, no other warranty or guarantee, either expressed or implied by any other person, firm or corporation, applies to this product.

Technical Support

We hope the preceding instructions are sufficient for answering any questions you might have about the installation of this product. However, technical support is available should you need it. We would ask that you first contact your place of purchase (e.g. model railroad dealer) for assistance. If you still need further assistance then please do not hesitate to contact us. You can reach us via phone, mail and email; our contact information can be found on the top of page 1.