miniTimer Addendum -- Please Read This!

One of the most important sections in the manual is the section on battery and igniter selection. Please read this section carefully and contact us if you have any questions. ***Be sure to ground test your timer with the battery and igniter you plan to use before attempting to use it in a rocket.***

It is very important to make sure that the battery you select will provide enough current to the igniter and maintain its terminal voltage above the minimum voltage spec for the timer. If you don't, the timer will reset without firing the igniter and damage to the timer could occur.

As an example, trying to use an Estes igniter (0.6Ω resistance) with a 9V alkaline battery is NOT a good idea. When the igniter is initially connected, you will be trying to draw (9 volts/0.6Ω) = 15 amps of current. This exceeds the capabilities of a 9V alkaline battery, and the battery voltage will drop considerably. If the voltage drops below approximately 2.5 volts (as it is likely to do) the timer will reset and remove power to the igniter before it has begun to burn.

If you need to use Estes igniters, you should use a lower voltage, higher current battery such as four series connected 2/3AA nicad cells (this is a common cordless phone battery). This type of battery will remain above 4 volts with a 0.6Ω load (6.7 amps of current).

If you need to use a 9V alkaline battery, choose an igniter with a resistance of 5Ω or greater. Fabrication of inexpensive igniters of this type is described in the timer manual. A good 9V alkaline battery will drop to about 6 volts with these igniters (6 volts/5Ω = 1.2 amps), still well above the minimum voltage spec for the timer. We have found Energizer 9V alkalines to have the highest peak current capability, Duracells produce less current, and Panasonic/Toshiba are not considered usable at all.

When in doubt, check your battery voltage under load. Obtain a 5 to 10 watt resistor (Radio Shack, etc.) with a resistance approximately equal to your proposed igniter. Two 1Ω resistors can be connected in parallel to create a 0.5Ω resistor, or in series to create a 2Ω resistor. Connect an accurate voltmeter to the battery that you will be using, and note the voltage. Briefly connect your chosen resistor across the battery terminals, and note the new voltage. If the voltage drops to less than 3.3 volts, the battery is not adequate for the load connected.

Also bear in mind that the miniTimer with cables (MT2A) is intended for lower current applications (less than 5 amps) due to the size of the connectors and wires. If you will be exceeding 5 amps of current, soldering heavier wires to the holes provided for this purpose is necessary. This is discussed in the manual.

G Switches

We now carry hermetically sealed mil spec 2.1G acceleration switches (part number GS21).

How to burn out your miniTimer

There are two ways you can burn out your timer:

1. Passing more than 20 amps current (continuous) or 40 amps (pulse). You need a pretty hefty battery to do this, so this isn't common.

or

2. Drawing a large amount of current (but less than 20 amps) that loads the battery voltage down to under ~2.5 volts (well below the minimum operating spec for the timer). In this condition the FETs won't be saturated (turned ON fully) and will be dissipating a LOT more power than they normally would.

You can minimize the possibility of this happening by:

a) Make sure the battery is adequate for the igniter so its voltage doesn't drop to less than 3.3 volts under any loading conditions.

b) Using short, heavy wires from the battery to the timer to minimize voltage drop to the timer. Make sure your power switch has an adequate current rating and low contact resistance.

c) Using much thinner, longer wires from the timer to the igniter. This will increase the effective load resistance in the event of a short at the igniter tip, minimizing the current through the FETs and the battery voltage drop. If you anticipate the possibility of the igniter tip shorting, you can add a 0.5Ω resistor in series with the igniter leads to minimize current draw if the igniter shorts. You will want to reverify that the battery voltage is still adequate to provide the current that the igniter needs with the resistor in place.

d) Use parallel twinlead instead of twisted igniter wires to minimize the likelihood of the wire ends fusing and shorting when heated by the motor exhaust. Make sure the igniter can be expelled from the motor nozzle after ignition to reduce the possibility of shorts.

Warning:

If the timer is damaged due to an excessive current/low voltage situation, the FETs may become shorted (constantly ON). If this happens, any igniter attached to the timer will fire immediately upon application of power. It is wise to pre-test the timer by applying power with the igniter OUT of the motor before installing the igniter in the motor nozzle.