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## **Don't Get Burned: The Benefits of Hit and Hold Circuits**

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06/04/2007

## Contents

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<b>Introduction</b>	<b>2</b>
<b>Brief Review: Hit and Hold Circuits</b>	<b>2</b>
<b>Summary</b>	<b>3</b>

## Introduction

Customers submit excellent questions to Parker engineers concerning their use of multimedia valves and one of the most common issues has to do with heat:

*"We are concerned because our valves generate an enormous amount of heat. The valve body warms up quickly and is too hot to touch. The valve is drawing on 0.5 amp at 24V. What can we do to decrease the heat dissipation?"*

Luckily, Hit and Hold circuit offer a perfect option customers can use to overcome these concerns.

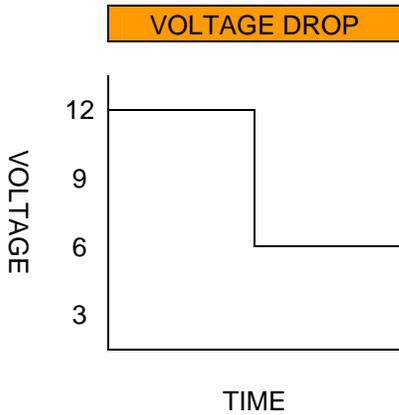
Hit and Hold circuits allow valves to be energized to full power and held for a short time before voltage and current are dropped to significantly lower levels, while still permitting the valve to remain energized. This method of operation requires less energy to keep the valve open than standard procedures. By requiring less energy, the valve runs "cooler," minimizing heat generation and decreasing power draw.

### **Brief Review: Hit and Hold Circuits**

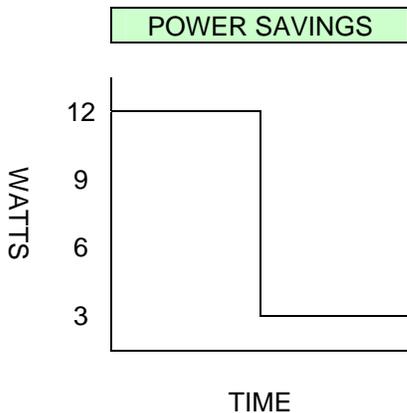
Operating multimedia solenoid valves at full voltage during high duty cycle applications generates unnecessary heat, ties up available power, and decreases overall cycle life.

A Hit and Hold circuit reduces power consumption and heat generation and, in specific circumstances, it can be used to overdrive a valve. Overdriving a valve by applying a higher than standard voltage for a short period of time before dropping to a hold voltage produces enhanced response time.

In a typical Hit and Hold circuit, the “hit” is at standard voltage. The “hold” is typically 50% (or less) of the standard voltage. For example, a 12 Volt valve can be “hit” with 12 Volts and then dropped to 6 Volts. Holding a 12 Volt valve at 6 Volts reduces power consumption and heat dissipation in the valve by 75% (see Graph 1 and 2).



**GRAPH 1: Voltage Applied to Valve**



**GRAPH 2: Power Dissipation in Valve**

These results are based on standard equations for determining power and current.

$$I = V / R$$

$$P = V \times I$$

*V: Voltage (volts)*  
*R: Resistance (ohms)*  
*I: Current (amps)*  
*P: Power (watts)*

Parker Hannifin offers several valve drivers that incorporate Hit and Hold circuits, such as the Valve Driver II and OEM Valve Driver.



**Valve Driver II**

### Summary

Hit and Hold circuits provide significant advantages for valves that operate for periods of extended duty. They can:

- Decrease the amount of heat dissipated
- Reduce power consumption while in the “hold” setting

Additionally, when an application requires a valve to consistently achieve maximum response times, overdriving the valve using a Hit and Hold circuit is an option to be considered.

Easy to implement, Hit and Hold circuits allow customers to get more out of their valve systems. **For more details, please contact Parker Hannifin, Pneutronics Division at 973-575-4844.**