MightyWatt Application Note 003 – Extending Power Dissipation with External Resistor

Introduction

An electronic load can have its power dissipation limit increased with an external power resistor. This technique uses the load power dissipation as the *differential* power dissipation in a single experiment. For example, if a load is rated 70W, an experiment can start from 50W and end at 120W, using only the difference as the programmable part and dissipating the rest on a different component – most commonly on a power resistor.

Example

Suppose you have a lead-acid battery which you want to test from 8V to 14V at 8A. For such an experiment, a 112W load would be required, which is too much for MightyWatt. The minimum power dissipation will, however, account for a 64W. This part does not need to be regulated and can be dissipated on a 1Ω resistor. The resistor will dissipate 64W continuously and drop 8V at 8A. If it is put in series with the load and device under test (DUT), the load will have to dissipate only the rest – from 0 to 48W, easily handled by MightyWatt.

If the experiment requires going from 0 to 14V, it can be split into two parts – the first part as described above and a second part where the resistor is removed and the load has to dissipate power from 0 to 64W.

Setup

If the DUT is not galvanically isolated from the load, then the resistor must be placed between the DUT positive terminal and load positive terminal (Figure 1). Use 4-wire mode and select it in the control application. Also, enter the series resistance into **Settings → Series resistance** so the load will recalculate its allowed power dissipation to reflect the presence of an external series resistance (Figure 2). You can also enter the power rating of your external resistor and select to stop the load automatically when the power is exceeded for more than one second. This automatic stop works in both 2-wire and 4-wire mode.
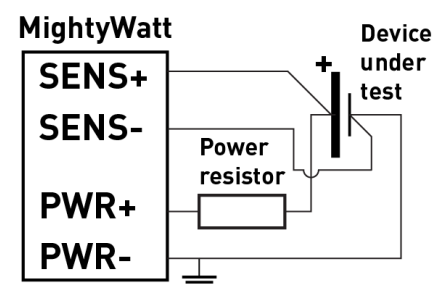
Increasing maximum power dissipation

Figure 1: Connection of external power resistor to increase the maximum power dissipation of MightyWatt.

Figure 2: Setting of series resistance to let the load know the total power dissipation will be larger than the allowed dissipation for the load alone.