

Application Note – PP600 Heat Output

The PP600 has a linear circuit to produce the constant current output. This means that it generates heat which needs to be dissipated.

Heat Output Per Channel

For a continuous output current the heat output is given by:

$$\langle \text{heat output} \rangle = \langle \text{output current} \rangle * (\langle \text{supply voltage} \rangle - \langle \text{voltage across lighting} \rangle)$$

where:

output current	Set by the user
Supply voltage	Voltage across VS1+ and GND1 (for channel 1)
Voltage across lighting	Voltage across LD1+ and LD1- (for channel 1)

This is usually easy to calculate as the voltage across the lighting is usually the voltage rating of the light given in its specification or can be measured using a voltmeter.

For a pulsed output the heat output is given by:

$$\langle \text{heat output} \rangle = \langle \text{output current} \rangle * (\langle \text{supply voltage} \rangle - \langle \text{voltage across lighting when pulsing} \rangle) * \langle \text{duty cycle} \rangle$$
$$\langle \text{duty cycle} \rangle = \langle \text{pulse width in seconds} \rangle * \langle \text{trigger frequency in Hertz} \rangle$$

When overdriving, the voltage across the lighting is more difficult to find out. In most cases it is reasonable to use the voltage rating of the light.

Total Heat Output

The heat output for the PP600 is given by adding the heat output for both channels, as calculated above.

There are several ways to reduce the heat output from the PP600:

- Use pulse mode. If the output is only on when you need it then you can dramatically reduce the heat output. Feed the camera trigger into the PP600 and pulse the lights.
- Turn the light off when not needed. If you don't have precise timing of when the camera will trigger, you can use Selected mode (SE 1) to switch the output off or on depending on the IP1 digital input (or use the PP610 and use RS232 commands to turn the output on and off).
- Reduce the output current if possible
- Reduce the supply voltage. Most PSUs have some adjustment in their output voltage.
- Connect lights in series instead of parallel. If you have an array of lights or LEDs in parallel then changing the arrangement to serial will increase the voltage across them but reduce the overall current.
- Use two PP600s and use one channel from each. For high power applications this may be the easiest solution. Even with one light, it is possible to parallel up two output channels from different PP600s.
- Use a PP810 or PP860. These controllers can dissipate much more heat.

If the heat output is no greater than 10W, then no heatsinking is required. If the heat output is between 10W and 24W then the PP600 needs to be bolted to a solid piece of metal to dissipate the heat. Above 24W, it is necessary to have a large heatsink with fan cooling.

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