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# DETERMINING ACCEPTABLE LOAD DISTRIBUTION

Per the data sheet, any output on a 506/516 module may be used to control as much as 20 Amps; on a 600/610/606 or 616 module 10 Amps. It is important that we consider the amount of current being drawn on each of the 6 outputs and the total amount of heat generated by the FETs for reliability reasons to keep the field effect transistors within their rated operating temperature. *If for example, with a 506 module, you anticipate that all of the outputs could be on at the same time and one of the outputs draws 20 Amps, the others should be limited to approximately 3.2 Amps each.* If one of the outputs were 10 amps instead, the others could each be as much as 8.4 amps. As you can see, the relationship is *not linear* and *does not always* add up to the module's total current capacity of 50 amps.

To determine if your particular load distribution is acceptable, please use the following formula, or stay within the examples shown on this sheet. These calculations assume an ambient temperature of 65$^0$C or less. The calculations also assume that all 6 channels are on continuously at the same time. If because of the operating logic, it is impossible for two outputs to be on at the same time, use 0 in the formula for the lower current output and perform the calculation. For a 506/516 module, the resultant of the formula should be 450, or less. For a 606/616 it should be 255 or less. If an output is on for a short duration, (10 seconds) and does not repeat for several minutes, then 0 may be used in the equation.

The field effect transistors are kept within their operating temperature by dissipating their heat into the surrounding air. *It is important that the metal heat sink on the top of the module is not covered by carpeting, paint, labels, or any other type of insulating material.* It is OK to mount the module inside an enclosure, provided that there is a volume of at least 200 cubic inches.

When continuously operating the module close to it's full load capacity, the heat sink will become hot. This is normal. *Care should be taken so that materials that may be damaged by heat, such as plastics, are not in contact with the metal heat sink.*

## I = average channel current

**For 00-00846- 506 and 516 modules $I1^2/2+I2^2+I3^2+I4^2+I5^2+I6^2=350$ or Less and $I_T$< or = 50 Amps**

**For 00-00846-606 and 616 modules $I1^2/2+I2^2+I3^2+I4^2+I5^2+I6^2=200$ or Less and $I_T$< or = 37 Amps**

**For 00-00802-600 and 610 modules $I1^2+I2^2+I3^2+I4^2+I5^2+I6^2+I7^2+I8^2+I9^2+I10^2=255$ or Less and $I_T$< or = 50 Amps**

**For 00-00888-600 and 610 modules $I1^2+I2^2+I3^2+I4^2+I5^2+I6^2+I7^2+I8^2+I9^2+I10^2=350$ or Less and $I_T$< or = 50 Amps**

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## Examples for 00-00846-506/516 Modules $I1^2/2+I2^2+I3^2+I4^2+I5^2+I6^2=350$

| Channel | No. | Amps | $I^2$ |
|---|---|---|---|
| 1 | $I^2/2$ | 10 | 50 |
| 2 | $I^2$ | 8 | 64 |
| 3 | $I^2$ | 8 | 64 |
| 4 | $I^2$ | 8 | 64 |
| 5 | $I^2$ | 8 | 64 |
| 6 | $I^2$ | 6.5 | 42 |
| Total | | 48.5 | 348 |

| Channel | No. | Amps | $I^2$ |
|---|---|---|---|
| 1 | $I^2/2$ | 10 | 50 |
| 2 | $I^2$ | 10 | 100 |
| 3 | $I^2$ | 10 | 100 |
| 4 | $I^2$ | 7 | 49 |
| 5 | $I^2$ | 4 | 25 |
| 6 | $I^2$ | 5 | 25 |
| Total | | 47 | 349 |

| Channel | No. | | 43.5 |
|---|---|---|---|
| 1 | $I^2/2$ | Amps | $I^2$ |
| 2 | $I^2$ | 20 | 200 |
| 3 | $I^2$ | 2.5 | 6 |
| 4 | $I^2$ | 10 | 100 |
| 5 | $I^2$ | 5 | 25 |
| 6 | $I^2$ | 3 | 9 |
| Total | | 3 | 9 |

## Examples for 00-00846-606/616 Modules $I1^2/2+I2^2+I3^2+I4^2+I5^2+I6^2=200<200$

| Channel | No. | Amps | $I^2$ |
|---|---|---|---|
| 1 | $I^2/2$ | 12 | 72 |
| 2 | $I^2$ | 5 | 25 |
| 3 | $I^2$ | 5 | 25 |
| 4 | $I^2$ | 5 | 25 |
| 5 | $I^2$ | 5 | 25 |
| 6 | $I^2$ | 5 | 25 |
| Total | | 37 | 197 |

| Channel | No. | Amps | $I^2$ |
|---|---|---|---|
| 1 | $I^2/2$ | 10 | 50 |
| 2 | $I^2$ | 8 | 64 |
| 3 | $I^2$ | 5 | 25 |
| 4 | $I^2$ | 2 | 4 |
| 5 | $I^2$ | 6 | 36 |
| 6 | $I^2$ | 4 | 16 |
| Total | | 35 | 195 |

| Channel | No. | Amps | $I^2$ |
|---|---|---|---|
| 1 | $I^2/2$ | 15 | 112.5 |
| 2 | $I^2$ | 5 | 25 |
| 3 | $I^2$ | 4 | 16 |
| 4 | $I^2$ | 2.5 | 6.25 |
| 5 | $I^2$ | 5 | 25 |
| 6 | $I^2$ | 4 | 16 |
| Total | | 35.5 | 200.75 |

## Examples for 00-00802-600/610 Modules $I1^2+I2^2+I3^2+I4^2+I5^2+I6^2+I7^2+I8^2+I9^2+I10^2=255$

| Channel | No. | Amps | $I^2$ |
|---|---|---|---|
| 1 | | 5 | 25 |
| 2 | | 5 | 25 |
| 3 | | 5 | 25 |
| 4 | | 5 | 25 |
| 5 | | 5 | 25 |
| 6 | | 5 | 25 |
| 7 | | 5 | 25 |
| 8 | | 5 | 25 |
| 9 | | 5 | 25 |
| 10 | | 5 | 25 |
| Total | | 50 | 250 |

| Channel | No. | Amps | $I^2$ |
|---|---|---|---|
| 1 | | 10 | 100 |
| 2 | | 5 | 25 |
| 3 | | 5 | 25 |
| 4 | | 5 | 25 |
| 5 | | 5 | 25 |
| 6 | | 4 | 16 |
| 7 | | 3 | 9 |
| 8 | | 3 | 9 |
| 9 | | 3 | 9 |
| 10 | | 3 | 9 |
| Total | | 46 | 252 |

| Channel | No. | Amps | $I^2$ |
|---|---|---|---|
| 1 | | 10 | 100 |
| 2 | | 10 | 100 |
| 3 | | 3 | 9 |
| 4 | | 3 | 9 |
| 5 | | 3 | 9 |
| 6 | | 3 | 9 |
| 7 | | 2 | 4 |
| 8 | | 2 | 4 |
| 9 | | 2 | 4 |
| 10 | | 2 | 4 |
| Total | | 40 | 252 |