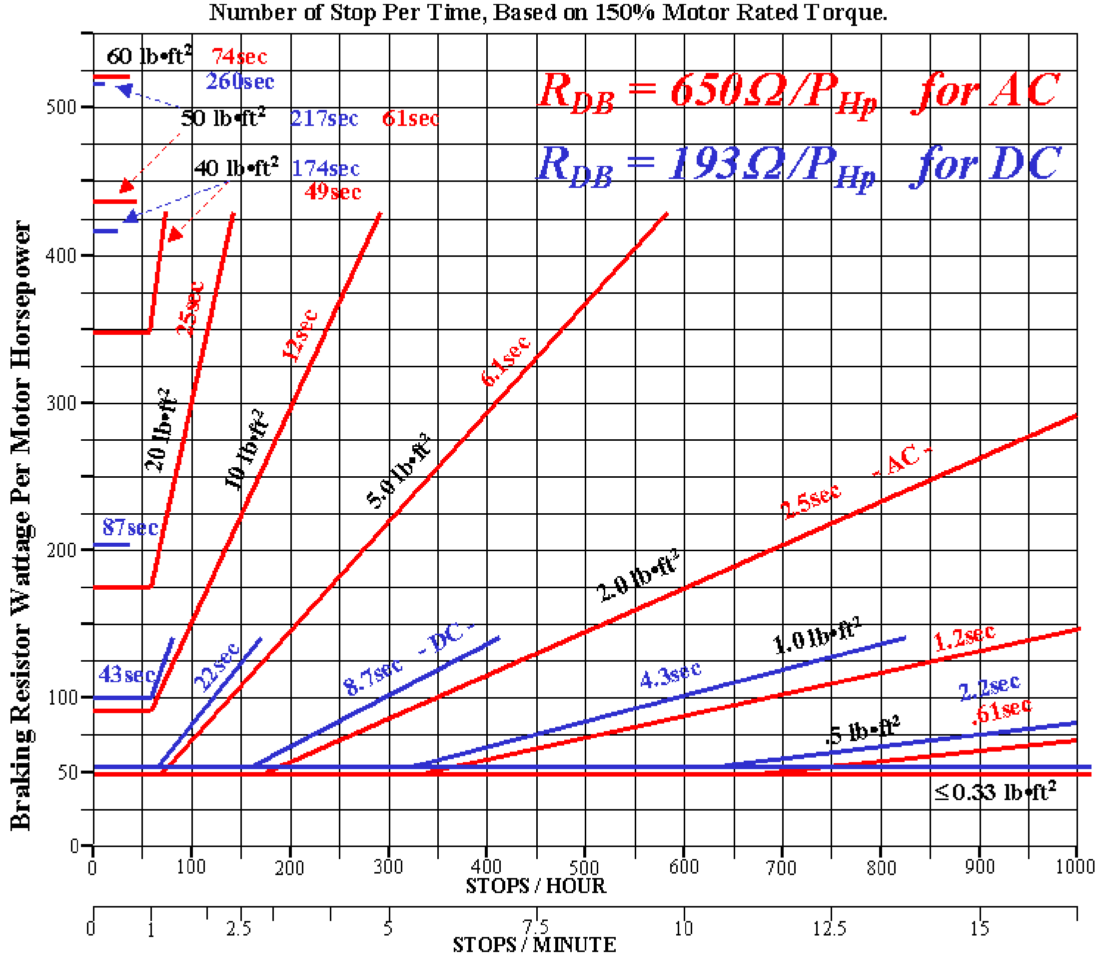
Application Note CTAN #179

Dynamic Braking Resistor Selection Chart

(Per Horsepower of Load)

Minimum Dynamic Braking Resistor Power Rating, Per Horsepower, for Various Load Inertia and Number of Stop Per Time, Based on 150% Motor Rated Torque.



The above graph is for **480VAC** drives. It allows the power dissipation rating of dynamic braking resistors to be determined if the total mechanical inertia at the motor and the number of stops per unit time are known. The graph provides the wattage required per horsepower of motor load with a braking level of **150%** of rated toque and the motor rotating at **1750 RPM**. The resistance for **1Hp**, as indicated on the graph, is **650Ω** for AC drives and **193Ω** for DC drives (and **500Vdc** motors)**.** For higher power levels the value of resistance must be decreased in proportion to the horsepower level - for example for **10Hp** AC, **65Ω** is needed and the wattage would be ten times that needed for **1Hp**.

As would be expected, as the number of stops required decreases, the wattage needed is less. However below a particular number the graph indicates a constant power level even if only one stop per hour is required for example. This is due to the energy per stop being too high to allow the safe use of any smaller resistor. The lines on the graph are for various inertia levels per horsepower - so to find the power required for a **50 lb ft^2** inertia, connected to a **10Hp** motor, one would use the line labeled **5 lb ft^2** (i.e.: **50 lb ft^2 /10Hp**). Many of the lines increase to a level, and stop. This is because the time for each stop is long enough that no more stops per unit time are possible.

An example: For a **50Hp** AC motor and **5 stops / min**, and **250 lb ft^2** : the inertia **per horsepower** will be **250/50 = 5 lb ft^2**. Using the **5 lb ft^2** line, the power/Hp would be **220W/Hp**. For **50 Hp**, then, **220x50 = 11,000W** would be needed.

For inertia values other than those that have associated graph lines other values can be interpolated between given lines. For lower base speed motors the resistance values will be the same, however the required wattage will decrease with the square of the ratio of the base speed to **1750RPM**. For the above example, if the motor was an **1150RPM**, the require wattage would be **$(1150/1750)^2(11{,}000W) = 4750W$**. This will be the case as long as the new calculate value is above the minimum shown on the graph, otherwise the minimum value should be used.

Questions ?? Ask the Author:

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