Characteristics of Brake Pack

How to Read Braking Characteristics (Reference values)

The brake pack provides stable braking characteristics for the instantaneous stop of the motor. The braking characteristics are illustrated by the braking curve, which indicates the amount of overrun corresponding to the load inertia.
The braking time is $4n/f$ seconds or less.
n: Overrun [rotation], f: Power supply frequency [Hz]

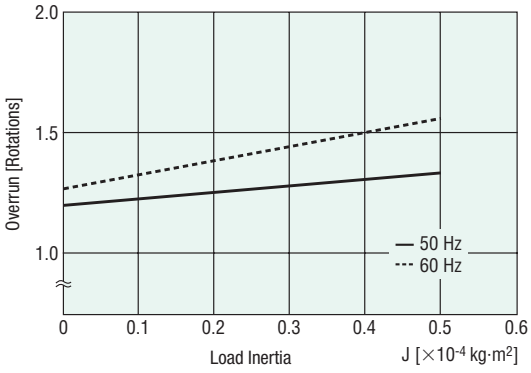
For example, if the **4IK25GN-AW2U** (single-phase 110/115 VAC, 25 W) and **SB50W** are used together to stop a load with an inertia of $J = 0.25$ [$\times 10^{-4}$ kg·m^2], the overrun and braking time required will be approximately 1.4 rotations and 0.1 seconds, respectively, at a power supply frequency of 60 Hz. In the case of deceleration using a gearhead, refer to the braking characteristics curve after converting the inertia at the output shaft of the gearhead to its corresponding value at the motor shaft.

Use the following formula to convert the inertia at the gearhead shaft to its corresponding value at the motor shaft.

$$J_M = \frac{J_G}{i^2} \text{ [kg·m}^2\text{]}$$

J_M : Load inertia converted to corresponding value at the motor shaft
J_G : Load inertia at the gearhead shaft
i : Gear ratio of gearhead

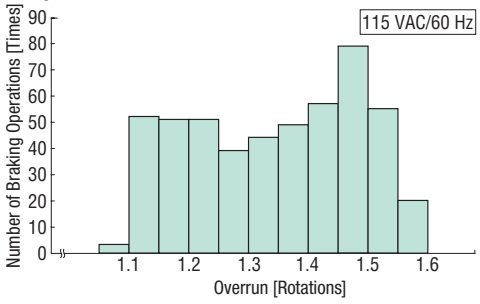
Example of Braking Characteristics with Brake Pack
Brake Pack: **SB50W**
Motor: **4IK25GN-AW2U**



Stopping Accuracy of Brake Pack

The figure to the right shows the stopping position error (variation in stopping position) when braking force is applied to the motor using the brake pack. The figure shows an overrun distribution when braking is repeated 500 times under the same conditions. Varying stopping positions are caused by the power-supply phase when the switch is operated to apply the brake, which can generate a maximum time lag of one cycle (power supply frequency) and variation in initial braking force. The sagging at the center of the right graph reflects the slot-position relationship between the stator and rotor.
Refer to the braking characteristics curve as a reference value representing the average overrun.

Brake Pack: **SB50W**
Motor: **4IK25GN-AW2U**
J: 0.25×10^{-4} kg·m^2

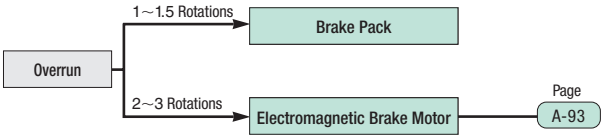


Other Brake Motors

In addition to the brake pack, various brake motors are available to suit a variety of applications.

How to Select a Brake Motor

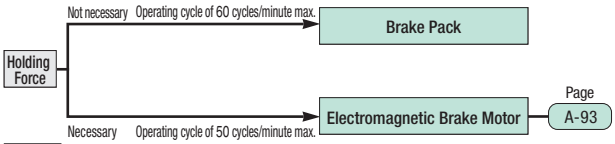
◇Selecting Based on Stopping Accuracy



●The values for overrun apply to the motor only.

●Low-speed synchronous motors can be stopped instantly within the stopping accuracy of 10˚ by turning off the power supply. Refer to page A-145 for details.

◇Selecting Based on Frequency of Use



Notes

●The operating cycles are based on brake responsiveness. The values specified above are the maximum values, so it may not be possible to continue braking operation at these frequencies.
●When actually using a motor, keep the surface temperature of the motor case at 90˚C or less, considering a rise in motor temperature.

●For low-speed synchronous motors, if operated within the permissible load inertia, the motor can start, stop and perform bi-directional operation within 1.5 cycles of the power supply frequency.
Refer to page A-145 for details.