FANUC

CNC Application Note

α Servos

α Servo Power Supply Selection

Supplement to GFZ-65162E/01 Section 3

General

Choose a power supply that has equal or greater continuous and maximum outputs than the continuous load and the maximum load calculated as follows. Do not exceed the maximum amplifiers that can connect to a power supply per table in GFZ 65162E/01, page 15.
This procedure applies to the typical machine tool (lathe or machining center) and takes into account the fact that the drives on these machines do not all operate at the same time, and even those that do not do so at full load. For other machines, it is necessary to know the application and to understand the power supply design to insure an adequate rating.

Determining Continuous Load Rating

For the typical machine, use the following formula:

Continuous Load = **Sum of spindle continuous ratings x 1.15** + **Sum of servo continuous ratings x 0.6**

Notes:
1. Continuous ratings for the servo and spindle motors are found in GFZ-65162E/01 on pages 16 and 17.
2. If there is only one spindle motor and no servos on the power supply, use the 30 minute rating instead of 1.15 multiplier.
3. If the machine has only servos and they are worked hard (such as on a punch press) consider the worst case load as the largest motors moving together and sum their continuous rating without using the 0.6 multiplier.
4. Keep in mind that the formula incorporates experience with loads on typical machines it does not imply that the power supply has extra capacity.

Maximum Load Rating

If the continuous load rating is 11Kw or less, (uses a PSM11 or smaller power supply), then use Formula 1. If continuous load rating is greater than 11Kw, use Formula 2.

(Formula 1) Maximum Load = **Sum of spindle accelerating maximums** + **Sum of servo accelerating maximums x 0.6**

Notes:
1. The PSM11 and smaller power supplies use a diode bridge for the input converter that has a higher capacity than the PS max rating. The regeneration circuit uses an IPM for control. During deceleration, the power averages 60% of maximum and this is why the formula uses the 0.6 multiplier.
2. Alarm 1 (excess load) only applies to deceleration. It is determined by monitoring the drop across a resistor in the supply line.
3. If known, only the servos that accelerate or decelerate together need to be summed (use worst case).

(Formula 2) Maximum Load = **Sum of spindle accelerating maximums** + **Sum of servo accelerating maximums**

Notes:
1. The PSM15 and larger power supplies use an IGBT to control the input converter and the regen circuit. The 60% average does not apply to the acceleration load, and so the 0.6 multiplier is not used. Actually if it needs more than 80% of the motor's maximum accelerating output, select the PSM based on 125% of maximum.
2. Alarm 1 applies to both input and regeneration.
3. If known, only the servos that acc/dec together need to be summed (use worst case).

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