

7 FACTORS TO CONSIDER WHEN CHOOSING THE RIGHT GEAR TECHNOLOGY

Choosing a drive involves several design factors that depend greatly on the task at hand. For more precise and exact movements, drives that have a high accuracy and repeatability are required. If a task requires a high torque output or speed, a larger drive or one with specific gear ratios will be necessary. The following is a list of the Top 7 design aspects you need to know that include sizing, mounting, speed, torque, accuracy, and repeatability.

1 Power Requirements (Speed / Torque / Duty Cycle)

- Most servo applications include speed and torque profiles that vary with time
- Gearing technologies have speed and torque ratings that account for these cyclic type applications
- Calculations for average torque and speed are derived from life limiting gear train elements
- Speed and torque calculations are generally tied to a service life, and will often, but not always, dictate frame size selection
- Methodology for calculating average torques and speeds & ultimately service life, varies from technology to technology

2 Output Bearing Requirements (Load Support / Accuracy)

- Servo gear reduction technologies often include a bearing system supporting the rotating output (shaft or flange)
- Many applications require a specific level of tilting moment capacity and / or tilting stiffness during operation
- Output bearing service life calculations need to be performed when the output element is subjected to significant radial or axial forces
- Gearhead size selection is often based on output bearing load capacity or true running accuracy

3 Accuracy / Repeatability Requirements

- Determined by torsional backlash, torsional stiffness, and gearing transmission accuracy
- Influenced by tilting moment stiffness and output bearing accuracy (concentricity, runout, & parallelism)

4 Inertial Match / Ratio Requirement

- Most servo gearhead selections are focused on inertia matching
- Other gearhead design selection criteria include torque amplification, motor speed optimization, and output bearing capacity / rigidity

5 Motor Mounting Requirements

- Ease of motor assembly
- Reliability and accuracy of motor shaft connection
- Range of motor face / shaft sizes which can be accommodated

6 Backlash Requirements

- High performance: 1 arc minute maximum
- Servo grade: 3 arc minutes maximum
- Medium performance: 10 arc minutes maximum
- Stepper grade: 20 arc minutes maximum

7 Form Factor / Size / Weight/Envelope

- Weight vs. Power density considerations
- Thermal considerations (material selection / heat dissipation)
- Space & sizing requirements



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