## Motion Sizer Quick Start Application Tutorial

1. Install Motion Sizer, launch the program and select a “New” application. The new application opens in the “Axis Design” screen
2. Under “Available Mechanisms” click “Disk”
3. Click “Append” at the top of the screen
4. Fill in the “Parameters” section to the right of the screen as follows:

a. Diameter = 5 in
b. Length = 0.1 in
c. Use the drop down material density help box (?) and select aluminum

5. The disk inertia should be displayed as 0.001525 in-lb s^2
6. To the left of the screen, click the “Velocity Profile” screen
7. In the upper right of the screen, in the Quick Setup section, choose “Trapezoidal” from the drop down box
8. Fill in the “Parameters” section as follows:
   a. Velocity = 3000 RPM
   b. Distance = 200 Revs
9. The Velocity and Torque graphs should update to reflect the entered move profile
10. To the left of the screen, click the “Motor Selection” screen
11. Note the required speed of 3000 RPM, and the required rated torque of 0.195 in-lbs.
12. One third of the way down the screen on the left, under “Search Parameters” change the drop down box from “All Motor Types” to “DC Servo Brushless”
13. Click the “Filter Motor List” and use the “Exclude” button to filter out all drives except for the Aries, and all motors except for the BE.
14. In the “Search Parameters” area change the “AMP AC/DC Power Source” drop down box to 120VAC
15. Ensure the “Access Database” radio button is selected at the top of the screen
16. Click the “AutoSelect” button
17. The BE341GJ motor and the AR-02xE drive is selected as the optimum solution.
18. To the left of the screen, click the “Report Generator” screen
19. At the top left of the screen, click the “Show Report” button
20. The report can be viewed online, or can be exported to a Microsoft Word document
21. To the left of the screen, click the “Performance Curves” screen
22. The various performance curves may be viewed online

## Motion Sizer Helpful Hints

**Help Available** - Motion Sizer has a comprehensive help file available by clicking the question mark symbol in the upper right of each screen

**Adding a mechanism to the motor** - In the “Axis Design” screen, first select the desired mechanism, then use the “Append” button at the top of the screen to add the mechanism to the motor. After the first mechanism has been added, the “Insert” and “Replace” options become available.

**Safety Factors** –

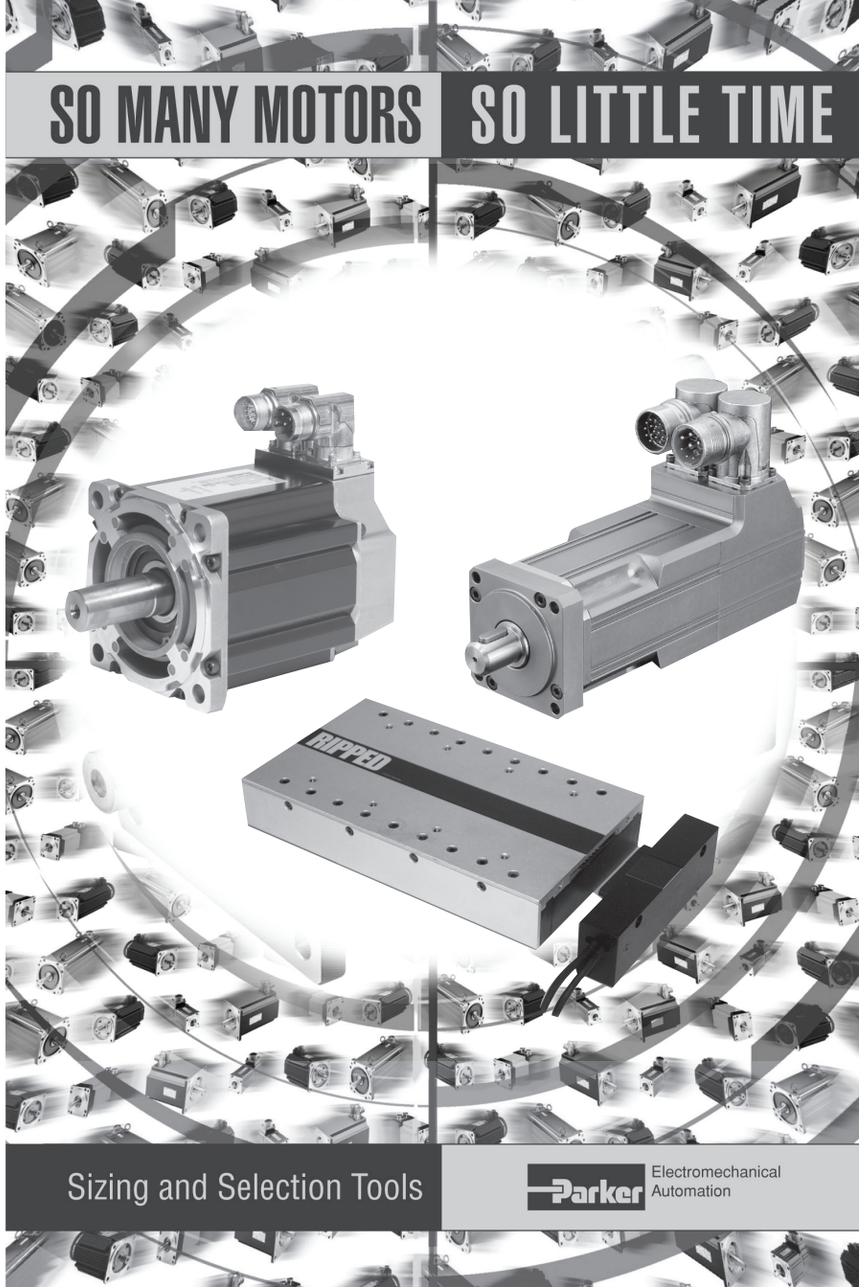
1. **Minimum Torque Margin** - Motion Sizer safety factors operate differently than in the previous DOS based “sizing.exe” program. In the “Motor Selection” screen of Motion Sizer the default setting for “Min. Torque Margin” is set to 1, and the default setting for “Max. Torque Margin is set to 20. With these settings, Motion Sizer will choose motors that have from 1 to 20 times the continuous or peak torque that the application requires. The default setting of 20 is not a 20% safety factor as it was in the old DOS based sizing.exe program. To select motors with at least a 20% torque margin, set the “Min. Torque Margin” to 1.2.
2. **Displayed torque values** - In the “Motor Selection” screen, the “Required from Motor” torque (includes both ”Motor Rated Torque” and “Total Acceleration Torque”) is automatically multiplied by the “Min. Torque Margin” setting.
3. **Default settings** - The Safety Factor settings are stored with the main program, not the individual application files. For example, Application #1 is opened and uses a safety factor of 1.0 and is then saved. Then Application #2 is opened, and the safety factor is changed to 2.0 and is then saved. Now if Application #1 is re-opened, the safety factor will still be set to 2.0, and must be changed back to 1.0 for Application #1 to select the same motors as it did originally.

**Inertia Ratio display** - In the “Motor Selection” screen, the motor of interest must be selected by clicking on it to see the inertia ratio.

**Motor Selection color codes** - In the “Motor Selection” screen the motor automatically chosen by the “Auto Select” button is always highlighted in green. The selected motor (double click) is highlighted in dark yellow. The currently selected motor (single click) is highlighted in light gray.

**Blank Reports** - In the “Report Generator” the “Show Report” button at the top of the screen must be clicked to update and show the report.

**Safety Factor checkbox** - In the “Performance Curves” screen, there is a “Use Safety Factor” checkbox. If the box is checked, the “Application RMS Torque” and the “Application Peak Torque” values will be multiplied by the “Min. Torque Margin” when displayed.



## Linear Servo Motor Product Differentiation

| | I-Force | LXR | Ripped | BLMA | MX80L | LX80L |
|---|---|---|---|---|---|---|
| **Form Factor** | Table or components | Table | Table or components | Table | Table | Table |
| **Technology** | Ironless | Slotless | Ironcore | Ironcore | Ironcore | Ironcore |
| **Cogging Force** | None | Low | Low | Low | Low | Low |
| **Magnet Rail** | Double row | Single row | Single row | Single row | Single row | Single row |
| **Force/Volume** | High | Medium | High | High | High | High |
| **Attractive Force** | None | Medium | High | None | High | High |
| **Heat Dissipation** | Good | Better | Best | Best | Best | Best |
| **Application** | Rapid, smooth, accurate | General Purpose | High Force | Long travel | Space-constrained | Compact, long travel |
| **Continuous Force Range, N (lbs)** | 24 to 881 (5 to 198) | 20 to 246 (4.5 to 56) | 154 to 2230 (35 to 501) | 310 to 689 (70 to 155) | 4 to 8 (0.9 to 1.8) | 4 to 8 (0.9 to 1.8) |
| **Speed Range** | >8m/s | 3m/s | >8m/s | Up to 7m/s | 2m/s | 3m/s |
| **Distinct Features** | Patented forcer design, Zero cogging | Resolution to 0.1 micron, pass through cable management | Patent -Pending anti-cog technology | Rolling wheel bearings, Travels up to 6m | Cleanroom and low-ESD options Cross-roller bearings | Cleanroom option, Recirculating bearings |
| **Choose this motor for** | Smoothest motion | Pre-Built Precision | High Force | Balanced ironcore | Smallest form factor | Longer travel lengths in compact form |

## Rotary Servo Motor Product Differentiation

| | MPP | BE | SM/SE | SMN | MaxPlus | Neo/J |
|---|---|---|---|---|---|---|
| **Technology** | Segmented stator | Bridged stator | Slotless stator | Segmented stator | Slotted stator | Bridged stator |
| **Detent Torque** | Low detent | Low detent | No detent | Low detent | High detent | Low detent |
| **Inertia** | Very low Inertia | Low inertia | Medium inertia | Low inertia | Lowest inertia | Neo - low inertia<br>J - higher inertia |
| **# Poles** | 8 | 8 | 4 | 8 | 4,6,12 | 4 |
| **Advantages** | • Broad Selection<br>• High performance<br>• Very High T/J ratio<br>• 3" to 11" motors | • High torq. density<br>• High T/J ratio<br>• Quiet operation<br>• Lower cost | • Smooth motion<br>• Reduced torque ripple<br>• SE - short length<br>• SE - lower cost | • Low-cost<br>• High performance | • Broad selection<br>• 1.5" to 12" motors<br>• High acceleration | • High T/J ratio<br>• Quiet operation<br>• J - high inertia |
| **Applications** | Rapid moves, high bandwidth, industrial | Rapid moves, high bandwidth | Smooth motion, lower bandwidth | Industrial, general purpose | Rapid moves, high bandwidth, industrial, food grade | Neo - Rapid moves, high bandwidth<br>J - Lower bandwidth, inertia matching |
| **Frame Sizes** | 92, 100, 115, 142, 190, 230, 270 | 16, 23, 34 | 16, 23 | 60, 82, 100, 114, 142 | 40, 66, 72, 89, 114, 142, 190, 320 | 70 / 34, 92 |
| **Torque Range** | 14 - 1434 in lbs | 1.4 -46 in-lb | 0.8 - 11.3 in-lb | 12 - 140 in-lb | 0.5 - 4000 in-lb | 6 - 61 in-lb |
| **Speed Range** | 0 - 5000 rpm | 0-5000 RPM | 0-7500 RPM std | 0-7500 RPM | 0-7000 RPM | 0-7500 RPM std |
| **IP65 Option** | IP64 standard, IP65 optional | no | yes | IP64 only | standard | yes |
| **Brake Option** | yes | yes | yes | yes | yes | yes |
| **Gearboxes** | yes | yes | yes | yes | yes | yes |
| **Resolver** | yes | yes | yes | yes | yes | yes |
| **Absolute Enc.** | yes | yes | no | yes | yes | yes |
| **Encoder** | yes | yes | yes | yes | yes | yes |
| **Custom Mods** | yes | yes | yes | no | yes | yes |
| **Choose this motor for** | Wide range of motors, apps requiring short, yet high torque motor, industrial motor, full customization | Rapid accels/moves, excellent performance at lower speeds | Higher inertia for mechanics, higher speeds, Ultra smooth motion | Volume applications not requiring customization | Wide range of motors in single family., food grade, customization. | Neo - Rapid moves and IP65<br>J - Higher inertia in larger frame size than SM |

## Stepper Motor Product Differentiation

| | LV | HV | ES/S/ZETA | RS | TS |
|---|---|---|---|---|---|
| **Frame Sizes** | 11, 14, 17, 23, 34 | 17, 23, 34 | 23, 34 | 34, 42 | 34, 42 |
| **Voltage** | 80 | 170 | 170 | 340 | 170 |
| **Drives** | E-DC, ViX, OEM | E-AC, Gemini, Zeta | Gemini, Zeta, S | Zeta240 | Gemini, Zeta, OEM, S |
| **Choose this motor for** | Cost effective, broad power range | Cost effective, broad power range | Extra smooth | 340VDC operation | Highest torque |

## Dynaserv Direct Drive Product Differentiation

| | DR5000 | DR1000 | DM1000 |
|---|---|---|---|
| **Torque Range** | 3-52 ft-lbs | 6-295 ft-lbs | 3-148 ft-lbs |
| **Speed Range** | 0-300rpm | 0-120rpm | 0-120rpm |
| **Repeatability** | +/- 5 arc-sec | +/- 3 arc-sec | +/- 1 arc-sec |
| **Feedback** | Resolver | Resolver | Encoder |
| **Distinct Features** | Outer rotor construction, resolution to 4,096,000, large aperture | | |
| **Choose this motor for** | Eliminates mechanical transmission, faster settling time, smooth low speed motion, zero backlash | | |