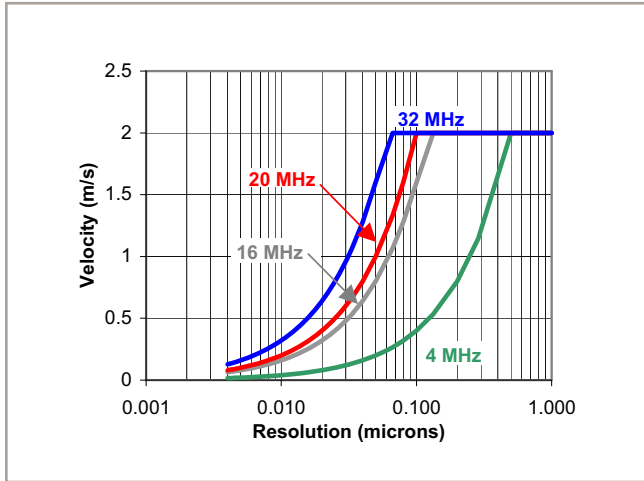


Computing Maximum Data Rate

In the specification section for each stage, Aerotech has included a maximum datarate chart. These charts are similar to the example maximum travel speed chart shown below.



The maximum travel speed chart shows the relationship between resolution and travel speed of the stage. To use these charts, first determine the resolution of the translation stage and locate this value on the X-axis of the maximum travel speed chart. Determine the data input rate of the motion control system and then move vertically to the intersection of the appropriate graph line on the maximum travel speed chart. Determine the value for the Y-axis at this intersection. This value is the maximum travel speed that may be attained without exceeding the system data rate.

ALTERNATIVE METHOD:

To calculate the maximum theoretical speed (MTS) that a system can obtain, the following information is required:

- R Resolution of the stage ($\mu\text{m}/\text{count}$ or arc sec/count)
- DR Data input rate of the system (counts/second)

Once this information is obtained, the following equation can be used:

$$\text{MTS} = \text{DR} \cdot \text{R}$$

EXAMPLE:

UNIDEX 100 stand-alone motion controller with 0.1 micron resolution linear translation stage:

$$\begin{aligned} \text{DR} &= 4 \text{ MHz} = 4000000 \text{ (counts/second)} \\ \text{R} &= 0.1 \text{ } (\mu\text{m}/\text{count}) = 0.0001 \text{ (mm/count)} \\ \text{MTS} &= 4000000 \text{ (counts/second)} \cdot 0.0001 \text{ (mm/count)} \\ \text{MTS} &= 400 \text{ mm/second} \end{aligned}$$

CAUTION:

To allow for system variances and the potential for velocity overshoot, the top commanded speed (TCS) should be ten percent less than the maximum Theoretical Speed (MTS) to prevent undesirable system performance.

For the previous example:

$$\begin{aligned} \text{TCS} &= \text{MTS} \cdot 0.9 \\ \text{TCS} &= 400 \text{ (mm/s)} \cdot 0.9 \\ \text{TCS} &= 360 \text{ mm/s} \end{aligned}$$

For high resolution, high velocity applications, the overall system data rate must not be exceeded.