

Application Note

Industry: Metal Working

Application: Application: CNC Plasma Cutting

Challenges:

- Memory storage
- Overcoming inconsistent metal surfaces
- Precise vertical control

Situation

CNC plasma cutting has become a popular technique for cutting metal, allowing the metals to be completely severed using an ionized, high powered stream of gas sent through a small nozzle creating an arc. This electric arc heats the gas in the nozzle to such an extreme temperature that it becomes plasma, simultaneously melting the metal and clearing away the metal debris.

Problem

Most plasma cutters utilize stepper motors, but often these motors accumulate errors and miss steps while cutting. These errors are compounded with the fact that metal surfaces are variably inconsistent and arc voltage can fluctuate. Since arc voltage is proportional to the distance between the nozzle and the cutting surface, the motors need to maintain precise heights for better accuracy.

Solution

Animatics' SmartMotor was used inside a CNC plasma cutter because of its ability to precisely control the height from the nozzle of the plasma cutter to the metals surface. This was accomplished with the onboard I/O of the SmartMotor creating a closed loop feedback based on the measured arc voltage. The plasma cutter was programmed to maintain an exact height over the metal despite frequent inconsistencies in the metal's surface and thickness, resulting in more accurate cutting with precise vertical control.

In addition, with the SmartMotor servo's internal controller and large amounts memory storage, the machine builder was also able to create dynamic CNC software for their cutting systems featuring DXF and G-code conversion.