Subject: Machine Tool Overview	Product: A1000 or G7 Drives	Doc#: AO.AFD.73
Title: Machine Tool		

Machine Tool

Application Overview

The Machine Tool application involves the cutting away or eroding a metal casting or block to create a part, using sharp edge tools. It includes a wide range of skills and requires the use of many different types of tools and specialized machines.

Industrial machines are typically installed as capital equipment. Machine tools are key to industrialization of a country. These machines perform such tasks as turning, boring, milling, drilling, tapping in order to machine simple and complex components in many materials ranging from alloys to plastics.

A machining center, for example, will have three or more axes of motion, an automatic tool changer, and will be computer controlled. One of the main parts of a machining center is the spindle head, which holds the tool that is needed to complete a certain task. A spindle is usually belted to an induction motor. Due to the various tasks that are required, the spindle rotates at various speeds and loads. These speed and load requirements can be met using an AC drive in conjunction with a spindle motor.

Various types of Machine Tools:

Boring Machines
Broaching Machines
Drilling Machines
Electrical Discharge (EDM) Machines
Gear Cutting Machines
Grinding Machines
Lathes
Turning Centers
Machining Centers
Milling Machines
Station-Type Machines
Milling machines
Polishing

Application Challenges:

- Fast acceleration/deceleration
- Large speed range, high speed operation
- High speed and position accuracy
- Orientation or positioning

YASKAWA

Subject: Machine Tool Overview	Product: A1000 or G7 Drives	Doc#: AO.AFD.73
Title: Machine Tool		

- Low maintenance, durability
- Complex I/O interface
- Continuous operation, repeated forward /reverse
- Constant high torque production
- Low vibration
- Fast stopping

Yaskawa Products:

Product	Feature	Benefit
A1000 or G7 Drives	Current Limit	Spindle motor can accelerate up in current limit thus providing the fastest acceleration rate possible.
	Built in Dynamic Braking Transistor for commonly used Drive sizes	Reduced costs when applying Dynamic Braking in order to achieve fast deceleration
	Overtorque Detection	The drive can warn the user of a damaging load related fault situation before it occurs by using Overtorque and/or Undertorque Detection. This is useful to detect any wear or damage along the cutting blades or bits.
	BCD/Binary Digital Input (DI-08,16 options)	• I/O Interface with numerical controls (NC) • Multi-function Inputs and Outputs • Speed Agree Output
	Energy Saving Mode (reduces the amount of excitation current that arises with lighter loads)	Suppress any vibration or instability that occurs when performing light machining for the finishing of the work piece.
	Zero-Servo and Orientation Function	Stop at a fixed location
	Maximum Frequency	High speed operation for smooth surface finishing Variable speed levels can be set by the user with a maximum of 400Hz

Application Details:

Refer to individual documents for application details on grinders, lathes, and machining centers.