

Subject: Application Overview	Product: A1000 and G7 Drives	Doc#: AO.AFD.62
Title: Extrusion		

Extrusion

Application Overview

Extrusion machines are used to create product by forcing raw material, such as plastic, through a die. Extruders are used to create a wide range of products such as tubing, sheet goods and insulation. Food processing is a popular application for extruders. Extruders employ a main drive motor to supply power to a screw, which provides the force necessary to push the raw material through the die. AC drives are commonly used to provide power to the main motor.

Application Challenges:

- Replace hydraulically operated or DC powered drives
- Precise speed control while material is being extruded
- Develop high torque at very low speeds

Yaskawa Products:

Product	Feature	Benefit
A1000 or G7 Drives	Dwell and Timer Functions	Allows the drive to operate automatically without setting up an external run sequence.
	Variable acceleration and deceleration times	The drive allows the user to switch easily to different acceleration and deceleration preset times when working with softer mixtures or harder mixtures.
	Multi-Step Frequency Reference	A 17-step Preset Speed Reference is available when working with difficult mixtures of various materials.
	Frequency Upper/Lower Limit	The drive is constrained to run within the Upper and Lower Frequency Limits even if a value outside that range is entered accidentally.
	Adjustable Speed Control Trim Control	A push button UP-DOWN switch can be used to make incremental speed adjustments instead of an analog speed pot input. Use Trim Control function to make fine adjustments to the extruder speed.
	Overtorque and Undertorque Detection	The drive is capable of detecting the consistency of mixtures and protect the load by using Overtorque and Undertorque Detection.
	Torque Limit, Stall Prevention During Accel/Decel, Stall Prevention During Run	The drive is capable of both protecting the load and detecting any foreign materials introduced to the mixture by setting optimal values for Torque Limits, Stall Prevention During Accel/Decel, and Stall Prevention During Run.
	Speed Estimation	The AC drive can automatically restart a Spinning Motor with "Speed Estimation- Speed Search" following a momentary power loss or fault condition.

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Application Details:

The extruder main drive motor supplies power to the extruder screw providing the force necessary to push the raw material through the die.

Yaskawa AC drives are digitally controlled drives, designed to develop high torque at low speeds. Since the extruders are often started with the barrels full of dense material; such as plastic, they need to quickly develop a large amount of torque to overcome the inertia.

The precise control of speed offered by the Yaskawa AC drives allows the operator of the extrusion machine to repeatedly produce product that are within design tolerances. This reduces cost and waste and saves precious resources.

Other benefits of the Yaskawa AC drives include built-in application expertise. If the operator accidentally enters a value outside of the upper or lower speed limits, the Yaskawa drive continues to keep the speed within limits. Acceleration and deceleration controls allow the operator to easily change from hard to soft mixtures.

Other features are designed to protect the equipment. Overtorque and Undertorque controls protect the motor from overload if the mixture's consistency changes. The drive will automatically restart following a momentary power loss or fault.

